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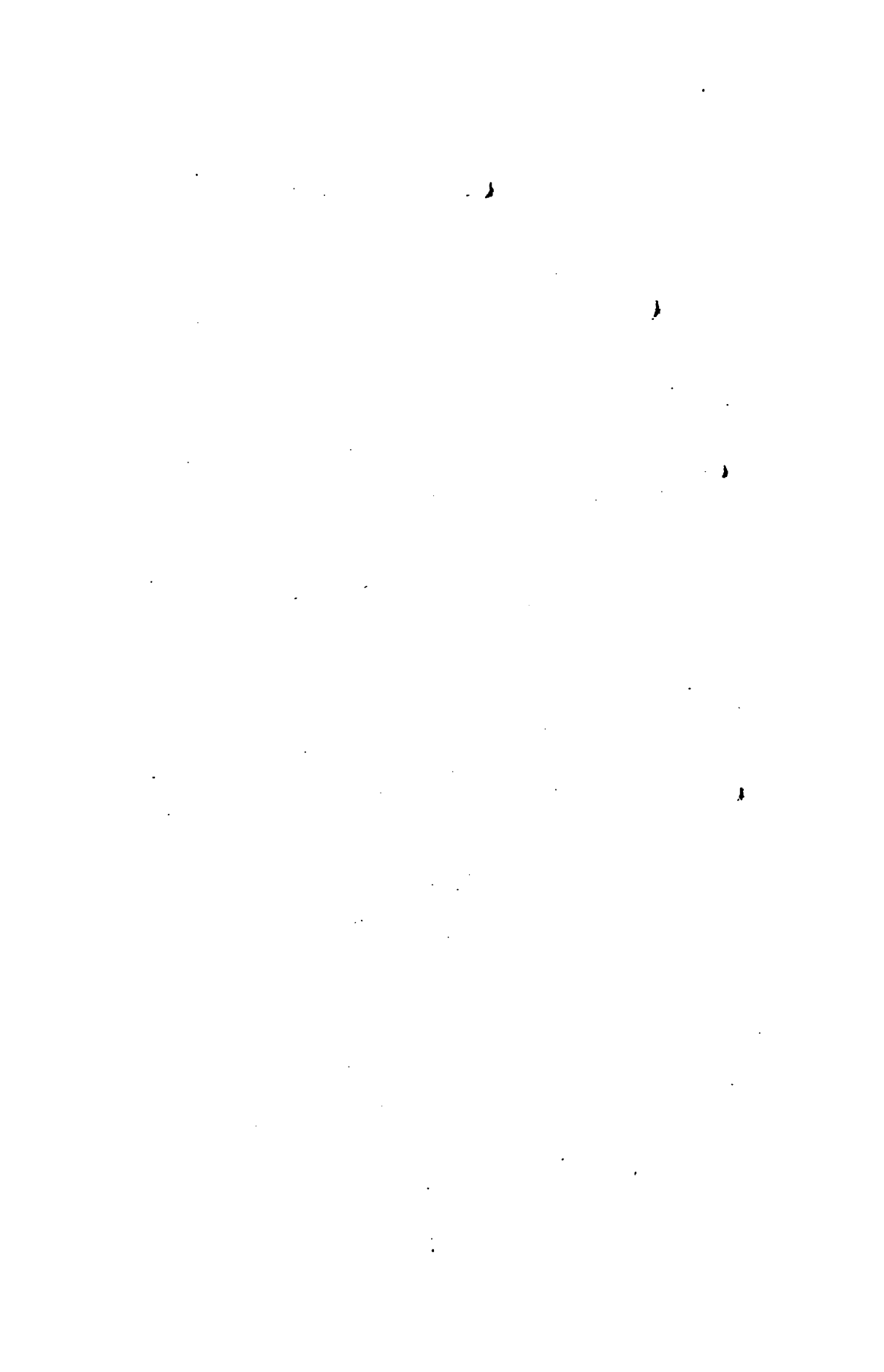
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FOR BOOKS RELATING TO
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A LECTURE

ON

THE ORIGIN AND DEVELOPMENT

OF THE

FIRST CONSTITUENTS OF CIVILISATION.

BY FRANCIS LIEBER.

COLUMBIA, S. C.

I. C. MORGAN.

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LECTURE.

The origin of important and extensive institutions, arts or contrivances, which present themselves to the inquirer, distinctly defined and in a certain state of completeness, has been generally ascribed to acts similarly distinct and definite—to conscious invention, deliberate agreement, united wisdom, sudden discovery or direct inspiration. So widely has this error prevailed at almost all former periods, that it is now but slowly yielding to the more substantial knowledge of calmer, more comprehensive and resolute inquiry.*

The Greeks, in common with all early nations, referred the origin of agriculture to a deity. Either they raised, by magnifying tradition, the individual, who brought to them the art of agriculture in a state of considerable perfection, from more advanced nations of the East, into a deity; or, when first they contemplated the many successive processes which constitute agriculture and its extensively beneficial influence, they clearly perceived, that it could not be the result of invention, even of the highest human intellect. They saw, perhaps, too, that the supposition of an invention of this sort, involves a contradiction. For, while husbandry was yet to be invented, its manifold uses, which might induce men to desire the invention, must be equally unknown; and while the blessings which agriculture procures for us, were yet unrevealed, the long train of various processes could not be guessed at, which ultimately led to the re-

* We cannot stop to inquire into the cause of this error so extensively diffused, but the student will be aided in finding it, if he will reflect on another very common mistake, akin to the mentioned one. It consists in allowing ourselves to be deceived by a distinct word for an indistinct idea, as if the latter were as concise and definite in our minds, as the sound of the first is distinct and definite in our ears. Languages in which it is grammatically easy to abstract, such as the Greek and German, are peculiarly apt to mislead the philosopher into this very serious error.

mote result of garnering up the stores of wholesome food for far more numerous people than merely the producers of the grain, and of weaning men from the roving life of the hunter, uniting them into peaceable and settled communities, mutually protecting their property.

Yet at some time or other, agriculture must have taken its rise. How then could they escape this dilemma? They ascribed the beginning of husbandry to inspiration, or direct instruction imparted by a deity. Ceres taught man to entrust the seed corn to the mother earth; Dionysus came from India to teach the Hellenic tribes the planting and fostering of the grape vine and the preparation of a generous beverage from its luscious fruits. The Chinese in a like manner, ascribe the first knowledge of planting tea and rearing silk to divine interposition. We on the contrary, know that to this day agriculture is practised among the many tribes of the earth in all the stages of gradual perfection, from the Oregon Indians, of some of whom a late American missionary reported that all their tillage consists in loosening the soil with sticks before they sow their maize, and that their wonderment at the sight of the first spade was without bounds; to the scientific white man who derives benefit from the counsel of a Liebig or Bossignault, and invigorates the productive powers of his wearied soil with the manure, which, thousands of years since, was deposited at the opposite end of the earth; while the vivid pictures of the Egyptian temples show us how far the ancient dwellers on the Nile, had advanced in this art, and how far our improvements go beyond theirs.

Even the origin of so simple an article as bread has been ascribed to a deity, the god Pan. He who reflected on the many different processes necessary to produce at last the savoury, nutritious and never cloying substance, called bread, saw that no man still unacquainted with it could possibly make it the problem of invention, finding by meditative ingenuity—such as conducted a Watt to the invention of the most exquisite contrivances—the chain of all the preparatory acts, without which bread cannot be produced. Our travellers, however, inform us that the art of making bread may yet be found in all its different stages of perfection; from the simple boiling of maize, and partial evaporation of the liquid, even without the process of grinding, to the inviting, light and snowy substance, which constitutes the delicious accompaniment of a Parisian or Viennese repast. Even the commencement and very measured progress of the art of grinding the cereals, is now well understood, since the

searching antiquary has discovered in the graves of generations long passed by, the rude stones unaltered by art but sufficiently shaped by nature to render them not unfit for the crushing of grain. These couples of convex and concave stones were with some tribes, with others the mortar and piston, the first substitutes for man's own grinding teeth.*

In a similar manner we find the origin of governments spoken of, as if it had ever consisted in a distinct act of establishing sovereign polities. Menu, the law-giver of Hindostan, is a god who in one of his avatars, visits the regions of the Ganges and founds the government, providing it at once with a complete code. In Europe, philosophers of the most opposite tendencies, Hobbes, Locke and Rousseau, speak of original contracts by which governments were created, or almost voted into existence. Our matured judgment, and reason, ripened in the social state, which requires government to keep it in existence, are thus ascribed to those individuals who, nevertheless, are supposed to be destitute of this institution. Hugo Grotius speaks of "purposes and ends for which property was first established," and many scholars to this day tell us of "the invention of language," while others assign its origin to inspiration, not seeing that the inspiring of an uncivilized tribe with a rich vocabulary would amount to a gift which cannot be used, and has no meaning, and that the inspiration of an abstract grammar is a nonentity, as much as a system of botany would be which had no reference to specific plants. There would remain then but two possible cases: either that the first and rudest attempts to designate things by certain sounds were inspired from on high, though divine wisdom has rendered this unnecessary by the wonderful organization of man and its adaptation to the wants of his intellect as it gradually develops itself; or, that, when men had arrived at a certain degree of civilisation, a more perfect language was suddenly superinduced by inspiration, which we know from history not to have been the case, and which besides would be surprizingly anomalous to the whole household of the Creator, in which progress, calmness and an unjarring development are among the fundamental principles. An inspiration of this sort, not consisting in the communication of a great truth, or in a divine coercion of the human intellect to find it,

* He who wishes to see all that was known of the science of agriculture and the history of bread-making down to the time of Goguet must consult his learned work on the Origin of Laws, the Arts and Sciences.

but in the sudden and lavish grant of a body of skill and art, would lower man, indeed, into a less complete being than the animal which is guided at least by primary impulsive principles.

Nor is it instinct to which we can ascribe the first beginning of those arts, institutions and contrivances, which are of an elementary and pervading importance to man, and which have this peculiar characteristic, that we never find man, even the lowest, destitute of them, though they may be but in their incipient stages, and that they rise in importance, develop themselves in variety of details, and acquire a more and more distinct character of their own, as society advances toward the highest degrees of civilisation, such as property, government, the family, language, exchange, the wants of taste, production and division of labour. These are of a pervading and permanent character, and unlike those deciduous institutions and arts, which, though extensively important are nevertheless transitory and preparatory, as despotism or hieroglyphic writing.

These first constituents of civilisation must not be confounded with, what may be called, the practical characteristics of man, though both often coincide and are always important with reference to one another. Division of labour, for instance, is found in no inconsiderable degree with the beaver or among foxes which hunt, though separate from each other, for a common end and by a regular plan. The practical characteristics of man, that is, those acts and manifestations of his inward state, without which we never find man even the lowest, and with which we never find the animal, even the highest, are the following:

1. Language, that is the conscious conveyance of ideas to others by articulate sounds, and not mere communion by impulsive utterances;
2. Individual Property and consequent mutual acknowledgment of rights;*
3. Exchange, which is the necessary effect of the former combined with man's judgement;
4. Sexual Shame;
5. The Family, Authority, Government or Superiors and Inferiors, independent upon physical force or instinct;
6. Religion, that is, some fear at least of superior and invisible powers, and a desire of propitiating them;
7. Taste or the Love of the Beautiful, though it manifest itself only in the rudest tattooing, painting or other attempts

* It is a remarkable and very instructive fact that with all nations the vengeance of blood or punishment of murder remains a private affair long after judges have been appointed to protect property. It was so with the Greeks, with the early Teutonic tribes, etc.

at ornament, and Rhythm in language, step or tune, which is connected with man's universal love of symmetry; 8. Punishment or the intentional infliction of some sufferance for some committed wrong, which proves the existence of conscience, that is, a consciousness that there are such things as right and wrong acts, and also of the universal intuitive conviction that it exists alike in all men. In other words man is always, and the animal never, an ethical, religious, jural, speaking, æsthetical and exchanging being.

When I say that these are the practical characteristics of man, I must of course be understood to mean man in the enjoyment of his entire humanity; in possession of a sound mind and all his senses, placed in that society which he cannot resist forming naturally around him. I should be strangely misunderstood, were I supposed to mean by these characteristics any thing founded upon ready made, innate ideas. I have elsewhere expressed myself at large on this subject.*

I am well aware that many may entertain a doubt upon the correctness of my enumerating sexual shame as one of the infallible characteristics of man. It is impossible in a lecture to enter into the details of this subject. I can only state my belief that all objections can be fully answered and that my statement appears to me strictly philosophical and correct.† As to religion, I own that I am ac-

* In my Political Ethics.

† When in the description of my journey through Greece, I was desirous of mentioning an important, although indelicate fact, my friend and guide, Mr. Niebuhr advised me to state it in a Latin note. I may be permitted to resort here to the same expedient, obliged as I am to touch upon details of an offensive character in meeting objections against my position.

Fuerunt in Saxonica Angliæ aetate, nec valde remoto tempore in Polynesiae insulis sodalitia mulierum ac virorum, qui ad appetitum venereum inter se explendum conveniebant. Constat inter omnes de eo quod Cato Censor detexit Bacchanalico sodalitis, et de nobilium virorum mulierumque, Carolo II. rege, positis vestibus saltantium coetibus, quorum apud Pepys mentio fit. Bajaderas templis adjunctas esse non ignoramus, et Herodotus in piis illis stupris enarrandis multus est, quae apud nonnullos veterum populorum in more fuerint neque a Strabone et S. Augustino (Civit. Dei 1, iv. c. 10) silentio praetereuntur. Jacobus Cook, nautarum celeberrimus, caerimonias describit, quas in regiae sponsae primo ac publico cum viro concubitu spectavit; nec alia ejusdem generis exempla nos deficiunt. Quae tamen exempla omni unquam mutuo pudore utriusque sexus personas vacasse non ostendunt; nam sodalitiarum istorum quaelibet fuerit infamia, ut tenebras certe quaererent, conscientia agebantur ac si quando simili modo a recta ratione ut supra vidimus homines aberraverunt, pia tunc superstitione et propitiandi numinis religione erant abducti. Praeter

quainted with a passage in Mr. Moffat's *Missionary Labours and Scenes in the South of Africa*,* in which he states that he found among the Bechuana people no belief in a deity, however crude, or in some sort of existence after death. They do not even adore a fetish. I know of no other instance, in a whole tribe, of a total absence of fear of some superior being, which seems indeed long to precede man's love of a deity, as in the case of the New-Zealanders. Injury seems to present itself to the mind more concentratedly than blessing. The lightning which shivers the tree is perceived by every one as an individual striking phenomenon, but it requires the power of abstraction, to gather the blessings of the vernal sun into one idea of divine benevolence.

This single fact, however, apparently constituting an exception, requires confirmation. If it really should be found as Mr. Moffat has stated it, and that there are no violent extraneous causes at work, we may be forced to admit that these degraded beings, who have not even attained to the idea of names for individuals among them, form a link between man and the brute, and would then be obliged somewhat to restrict this characteristic of religion.

On the other hand, it must be admitted as a striking fact, that those blind deaf-mutes, or as you will permit me at once to call them for convenience sake—those blind-surds, who of late have attracted so much and just attention, Laura Bridgman and Oliver Caswell at Boston, Julia Brace in Connecticut, Anna Temmermans at Bruges, James Mitchell at Nairn in Scotland, and many others†—that all these unfortunate beings who from earliest infancy were enveloped in lasting darkness and stillness, shut out from all communion with the world, show the practical characteristics which I have enumerated, so far as their privation of the senses admits of them. Every blind-surd shows a decided consciousness of Mine

caetera autem incestus crimen, quod inter omnes omnium aetatum homines genitorum certe cum genitis conjugio infigitur, hoc loco commemorandum esse videtur; brutum enim quominus id, quod hominibus incestum est, impune perpetret, ne instinctu quidem naturae prohibetur. Est quidem, etiam inter natos ac parentes, commissum incesti crimen, sed pariter est furtivum, et multum abest ut suum cuique deberi furem ignorare judicaveris.

* London, 1842.

† Abbé Carton gives an account of many blind-surds in Europe, in his work on Anna Temmermans, Ghent, 1843, and Dr. Howe of Boston mentions others, in his last Report on the Perkins Institution for the Blind. This Report of Dr. Howe's is of the highest interest, as indeed all his previous ones were.

and Thine, and a consequent perception of the value of exchange. They deeply blush if detected in filching. All show a decided sense of decorum; a consciousness of right and wrong, and resentment at injustice; all willingly acknowledge superiors, even among themselves, which latter is at least the case in the only instance in which, to my knowledge, two blind-surds have been brought in contact, namely Laura Bridgman and Oliver Caswell. All have shown the internal necessity of language, which promptly manifested itself so soon as ingenuity and wisdom had contrived the means of breaking through the thick walls which kept their souls immured and of establishing a bridge of communion with the outer world. They seem to have no conception whatever of rhythm because they are deprived of hearing. The same may be observed with deaf-mutes.* The blind-surds, especially the female, show a decided desire of adornment, and Laura at least, elevated herself to the idea of a superior being by perceiving the rain, learning that it was a great benefit and finding, upon inquiry, that no fellow mortal of her's can produce it.

I shall revert to the blind-surds when treating of language, and now return to the subject more immediately in hand. We were speaking of instinct as being insufficient to account for the origin of the constituents of civilisation.

Instinct is a primary and irresistible impulse towards the obtaining of a remote and important object unknown to the individual—an impulse uncontrolled by it, but controlling it. And the law of this impulse is, that its action is the intenser, more unfailing and direct, the more limited the sphere of action, circumscribed the life and confined the intellect of the individual are. Instinct and the destiny of the being stand in an inverse ratio, and as man's destiny is the highest, amplest and most manifold, so are his instincts the most limited. Indeed they are almost confined to his earliest infancy, when he resembles the brute creation most.

It will hardly be necessary to mention Chance as the possible cause which gives birth to the elements of civilisation. Those who

* Deaf-mutes show an almost universal disregard of poetry, because neither rhythm, harmony nor rhyme exists for them. But I have known a deaf-mute who was very fond of dancing, keeping admirably time. He perceived the rhythm of music through his sense of touch by the concussion of the air, and possibly the sense of rhythm might be awakened in a similar manner even in the blind-surds by dint of long perseverance.

believe that mankind and their progressive civilisation owe their existence to a Maker, and have been created for grave and weighty purposes, cannot resort to chance in order to explain their most important phases and most essential developments. Nor can he that denies these solemn purposes; because the universality of the phenomena wholly excludes this, the sorriest of all explanations, which indeed betrays a great want of reflection.

If then neither instinct, nor conscious action, nor inspiration induce man to enter upon the career of civilisation, which is his destiny and essentially natural state, it must have remained very doubtful whether those constituent elements would be found out or not, did there not exist a principle which seems to lie at the foundation of all human history and upon which all advancement of our species appears to depend, namely that the first starting in the different branches necessary for civilisation, is not left to the option of man but closely connected with the material world, and is an inevitable result of the relations in which man, with his peculiar organisation and his expansive intellect is placed, to the material world around him.

This is the law which we observe with all those nations which hitherto seem to have been destined for civilisation. If we are asked, why then did the same principles not produce similar results with many tribes which to this day have remained in a barbarous state, and have no interest for the historian, however attractive they may be to the naturalist, all we can answer is, that the law which has been stated is the one which can be clearly discerned with the tribes that rise into civilisation; but why, if the true destiny of man is civilisation, so many tribes, showing indeed its rudiments, pass away long before they have developed them, can no more be explained by man here beneath, than why annually innumerable peach blossoms should drop ere they swell into fruits, although it will not be denied that the evident destiny of the blossom is to change into a peach; or why there should be animals with rudiments of organs, which are fully developed and of the highest use only with species standing above them in the great scale, but to themselves wholly useless. Indeed the question can be applied to the risen tribes, so to call them; for, if civilisation, if pure religion, if peace and good will, are the destiny of man, why do so many individuals pass away before their own tribe attained to them? Why, we may proceed, is man a social being constantly acting upon and acted upon by others? How is his individual responsibility and

individual value, which cannot be denied unless we deny humanity altogether, reconcilable with this equally undeniable law of sociality? These are God's own truths; mortal eye can never penetrate the mystery. Yet one phenomenon may be mentioned as already revealed by history with reference to the destiny of mankind for civilisation and its growing expansion. It is this, that while in antiquity we find a strict succession of one civilized nation to another, the succeeding one improving on the antecedent, and predominating for a time over the others—a monarchical principle, as it were, in the line of succession—we find in modern times rather a commonwealth of civilized nations. In antiquity history coursed in the narrow channel of single countries; in modern times history resembles our own broad ocean where the flags of many nations meet. It is christianity and the broad universal character of modern knowledge, closely connected with christianity, which have rendered possible this striking phenomenon. With the ancients every thing was strictly national; religion, polity, knowledge, literature, art, acknowledgement of right, all were local; with us, the different colours on the map do not designate different districts of religion, knowledge, art and customs. There are wires of mental telegraphs which cross all those red and blue and yellow lines. And who will say that the time cannot arrive when that broad sea of history, as we just called it, this commonwealth of active and polished nations shall extend over the face of our planet?

Let us now proceed to give the necessary illustrations of the law that the necessity of starting in the elements of civilisation arises out of the relation in which man is placed to the material world.

Population cannot increase, nor civilisation expand, without exchange, commerce and an ultimate peaceful international communion. Consequently we find this law of the utmost simplicity, that while on the one hand, those wants of necessity as well as taste which daily recur, are manifold in each individual and very uniform all over the globe, the capacity, on the other hand, of satisfying these wants, inherent in the various regions of the earth, is varied in the highest degree.

The palates of all men are pleasantly affected by the taste of sweetness; so much so, that in most developed idioms the word sweet is used no longer in a tropical sense—at least it must be called a very faded trope—for that which charms by gentleness, purity, loveliness, and is dear to our hearts. We say sweet child, a sweet

song, sweet temper, sweet wife, and even sweet saviour. Every where do these expressions, derived from sensual affection, go directly to the souls of all men in all climes and of all ages, because the palates of all delight in a properly tempered degree of sweetness. Yet the rays of the sun fall upon few countries only in that angle which is necessary for the growth of the cane that yields the most desired among the saccharine substances. All men relish sugar; few countries grow it. A deep blue colour has ever pleased the eyes of all men, their organs of sight being of uniform structure; but indigo, furnishing the richest dye of this favourite colour grows in very limited districts only. All men value the many pleasant, pliant and easily dyed tissues of wool. Our Indian covets a blanket, and Homer delights in singing again and again the beauty of the soft purple carpet and delicate woollen cover worthy the acceptance of a king; yet the sheep which furnishes the fine and limber thread is not reared in all regions. Adorning silk is valued in the Orient as by the Western race, because its tempered gloss and ready reception of the richest colours and of every tint of delicate or gorgeous dye are agreeable to all eyes, and because the minds of all men are so constituted that so soon as the wants of necessity are satisfied, they are happily followed by the wants of taste, the desire of ornate comfort, and the ever active yearning to rise in condition and make our mode of existence agree with it. Yet, universal though the consumption of silk stuffs be, its production is confined to very few parts of the globe. Cotton has become a blessing to mankind, promoting health, decency and respectability, where squalid want, disease, vice and tattered disregard of self, prevailed with millions upon millions. In Asia, Africa, Europe and America, the rich and the poor, young and old, the coloured and the white stand in need of cotton, while the countries producing this commodity can be easily numbered. The same may be said of all farinaceous substances, wheat, rye, maize, rice; of wine and oil, of iron and copper, leather, meat and fish. It is the all-embracing law of mutual dependence operating in the narrowest as well as the widest circles, between individuals and nations, near and afar. It is the great law of territorial division of labour and consequent union of men. The animal is doomed to labour in its confined sphere, under individual independence and isolating self-sufficiency; man alone was blessed with the injunction of mutual dependence, a constituent of love and forbearance.

If in an opposite manner men had been created with wants widely differing in the individuals, and the material world been so constituted that every individual could at once have found the means of satisfying these desires, close at hand—a plan which in all probability human wisdom would have conceived of—the earth would now be dotted with independent, insulated, grovelling, selfish and self-satisfied clusters of men, still more abased than the present tribes of hunters; a sort of population which by no art or invention of its own could ever have risen above its mean condition.

Man is a political being. He cannot find his proper destiny without the State. It was, therefore, not left to his option to unite into a government, nor was he driven by instinct to its formation, as the bee congregates into a social life. God created man the only mammal which stands in need of parental protection for a long series of years after the period of lactation, and whose desires and inclinations, arising out of the difference of sexes, which becomes more marked as the animal stands higher in the scale, are not limited to a season, as is the case with the brute. And as no original and inherent principle in our nature is either mischievous or useless in itself, but given, along with regulating and bridling reason for the wisest purposes, so it is in this case.

So soon as the brute parent ceases to furnish milk to the young one, it shifts for itself. The child of man alone requires support and protection up to its seventeenth year or later, while in the mean time other children are born, and time is given to their intellects and affections to expand and grow in strength, and thus attachment, gratitude, respect, obedience and mutual support to spring up. The institution of the family becomes inevitable. Men are unfailingly, though progressively led into the formation of it, and so soon as formed, the institution possesses and forever retains an expansive character. For, the family gains in importance as the school of mental, moral, religious and political culture of the young as well as the old, as civilisation advances. "Children do not only stand in need of parents; we parents stand as much in need of children."* Out of the family arises the patriarchal state, or, rather it is the patriarchal state, from which the other forms of government progressively proceed. Authority, language, property, and the important consciousness that men do not only form a society as to the

* Schleiermacher in his Speech at the Grave of his Son.

present time, but also and necessarily a *continuum*, and not an accidental aggregate of "huddled units," all these find their incipient stages in the family.

If we suppose that man had been organized like the brute, which is not as helplessly born as he is, and becomes far sooner independent, a human family would be as unknown as a family of brutes. Yet at a first superficial glance the animal might appear the more favoured of the two, which may have been one of the reasons that have led so many tribes to the worship of animals.

Individual property is one of the primary constituents of civilisation, and man could never have arrived at a full and clear perception of individual property without production. For, he is conscious that what he produces is his own, and that every one knows it of his own production as he does; and he is conscious, too, that he cannot produce without previous appropriation. But production and appropriation are no art or idea voluntarily invented by him. He was coerced into them by the unprotected state in which he is placed in the world. Unclad by any fur, unprovided with talion or protruding mouth, unwinged and unfit to pursue the swift animal or to climb after the nimble beast, with a keen appetite and a relish for a great variety of food, with young ones for years dependent upon him, and a nature around him which in its most bountiful state affords but scanty and precarious food to the merely gathering man, he was obliged to entrap or shoot the animal, that is to appropriate by skill, which is production, and gradually to produce still more exclusively, intensely and widely. He thus came to the clear perception of property which exists long before those more stable governments which we are accustomed to call states in particular; or which exists from the first beginning along with the earliest forms of government. Man entered upon the great career of industry, agriculture and exchange.

We may possibly imagine man, in a very low state, to grope his way with a system of signs not consisting in sounds. But such a language, if we can call it thus, must in its nature have remained very confined and confining. It could never have become the ready mould of his thoughts, the copious means of varied intercourse, the binding tie of society, the conveyance of thoughts, feelings and experiences to distant generations, and could have never expanded into a literature, another of the indispensable foundations of a fairly developed civilisation. Was then this phonetic language left to his

invention? He might have found other signs at the time more convenient, as even now some persons do for certain purposes, and those signs might have satisfied his early wants, and forestalled the origination of a phonetic idiom. The necessary phonetic language, however, that is communion by oral sounds, was not left to man's option or precarious ingenuity. He was constituted in a manner which obliged him to make use of sounds as the chief signs of communion. Man has thoughts to communicate and is so essentially a social being that communion of itself is pleasant to him, nor can he avoid involuntarily to show by various sounds, emotions which may deeply affect him at the time. Every excitement causes in him as in all other animals, a quicker respiration or an oppression of the chest which seeks vent through exhalation or inhaling; but his emotions are far more varied than those of the animal and the organs, through which they chiefly seek vent, the throat and mouth, are far more pliable and admit of a much greater variety of sounds, so that his more numerous passions and affections, especially with the savage, make themselves known with greater accuracy and by a greater variety of oral sounds. He breathes spite, pride, longing, fear, wrath, wonder, pity, courage, regret, attention, pain, encouragement, resolution, confidence, through his mouth and nostrils—sounds which are readily understood by others, because they belong to all, and gradually condense and shape themselves into distinct or articulate sounds, that is words—a process similar to that by which the primitive utterances of pain, Ah! Eh! were gradually cast into the articulate sounds *Hélas* and *Alas*. The early Asiatic languages prove this as Herder has shown long ago. Man's pliable and docile organs furnish him in the mean time with ready means to imitate the phenomena of sounds around him, and he wishes to imitate them because he has the desire and feels the necessity of communication. It is thought, undoubtedly, from which first of all language proceeds, that is the willed conveyance of ideas by signs. He can imitate, or designate by partial imitation, other things than sounds, but none so readily, nor does probably any phenomenon strike the mind of the untutored savage so powerfully as sound. It is the most concentrated characteristic of things. The eye perceives things in their totality, and for that very reason its perceptions are unpronounceable. Take a cataract. We perceive a vast phenomenon of substance, colour, motion and constant change at one and the same instant, while the ear carries the single impression of the rumbling roar of tumbling waters to the mind. The eye perceives the totality

of an animal—form, colour, movement at once; the ear takes in the single yet striking characteristic of bleating, lowing or cooing. This strikes separately, and can be imitated. Colour, time, weight, surface, taste, scent and substance cannot be imitated at all; form and motion but partially; sound however completely. We have thus the second element of phonetic language and see that man could not otherwise but resort to sounds produced by the mouth, for communicating his thoughts in the far greater number of cases, though he undoubtedly assisted his first phonetic attempts by signs appealing to the eyes. These imitative sounds, once existing, became likewise gradually more and more defined, or articulate words, and, a body of phonetic signs once existing, it soon became the nucleus for others, and, by composition, for inflections, while in the mean time, as man's mind found or suspected affinities in things or feelings, his organs became more skilful. The family alone, into which man is forced, must have produced abundant opportunities for phonetic signs of affection, passion and necessity.

So very natural indeed is the breathing out of thoughts or a phonetic language to man, that I found Laura Bridgman, the blind-surd, in imparting to whom a complete finger-writing and a general education Dr. Howe of Boston has so eminently succeeded, to possess between thirty and forty "noises" for the various persons of her acquaintance. She produces them often for herself, and of course without knowing their effect. When asked, on such occasions, why she made the "noise" for such or such a person, she will answer that she happened to think of that particular individual. So, when she perceives with her keen remaining sense, by the peculiar jar of the floor, who has entered her room, she quickly exhales the "noise" for that person, merely because that individual forms at the time her thought, and thought seeks vent. For other things she has no "noises," though she utters many emotions. These sounds, however, have been carefully repressed by telling her that they are painfully disagreeable to others. The reason why Laura has distinct noises for persons only, is, no doubt, because she, in common with us, thinks in words, ever since she has been successfully educated, with this difference, that we think in phonetic or oral words, but she in digital words,* and as a deaf-mute, probably, thinks in written words. Per-

* Whenever she thinks in a lively manner for herself, and even in her dreams she writes her thoughts with one hand in the other, as many of us move the lips, without speaking, or as we speak in our dreams.

sons have, indeed, their names, which Laura knows perfectly well, but their rare occurrence may be the reason, why with regard to them, the primitive breathing shows itself as a means of designation or involuntarily. Some of these sounds are inarticulate, but others not so, for instance Fee-fee, Puh-puh, Lull; others consist in a mere breathing with a slight vokal admixture, while others again are but the prolonged exhalation of liquids. I could not discover in these sounds any intended or conscious expression of the individuality which Laura may ascribe to the respective persons.*

When we contemplate a perfect language such as the Greek or Sanscrit, or the surprising character of the holophrastic idioms of our Indians, we are lost indeed in amazement, and cannot conceive how man, unaided by superior intellect, should ever have invented so stupendous a scheme. Man was not, as we have seen, unaided. Far from it; he was coerced into the beginning, and as to the systematic development, we must not forget that God gave man reflection and thought, which through uncounted millenniums moulded sounds into words and, by the most imperceptible processes, out of words inflections, that many of the processes are daily yet going on around us, and that indeed but few idioms do attain to a high degree of excellence. In almost all languages that which we cannot say, amounts to more than what we can say, and languages, such as the Chinese, show us how entire idioms can consist of sounds of one kind only, which are neither verb nor noun, incapable of any inflection and must be understood, as we understand the first prattling of our infants—by the juxtaposition of those elementary utterances. Language affords no greater subject for surprize than the art of alphabetic writing, that is writing by characters, which have reference to the sounds of words and not to the idea itself, as our characters for numbers do, and which therefore may correctly be read by the most different nations. Who could have contrived so stupendous a scheme or conceived so remarkable a thought as to invent visible characters for audible signs of ideas? This art was, therefore, likewise ascribed by the ancients to divine origin, but we, since Champollion has deciphered the hieroglyphics, have all the stages of the art of writing before us, from the first pictorial, the direct symbolic

* I found Laura indicating her inner state also by other signs, e. g. the shaking of the head for negation, nodding for affirmation, elevating her hands in wonder, expressing surprise by an oral sound such as we produce on similar occasions.

and faded symbolic or conventional hieroglyphic, the phonetic hieroglyphic up to the alphabetic phonetic signs. We see on the walls of the Egyptian temples, that the transition from ideographic signs to phonetic characters was gradual and natural, although the whole contrivance of alphabetic writing remains one of the most remarkable discoveries, quite as great, if not greater, than the art of printing.*

But is language a more wonderful contrivance than a highly developed government, a British polity with its common law and parliament and county administration, navy, colonies and sub-empires? We know nevertheless that these have not been established by divine inspiration.

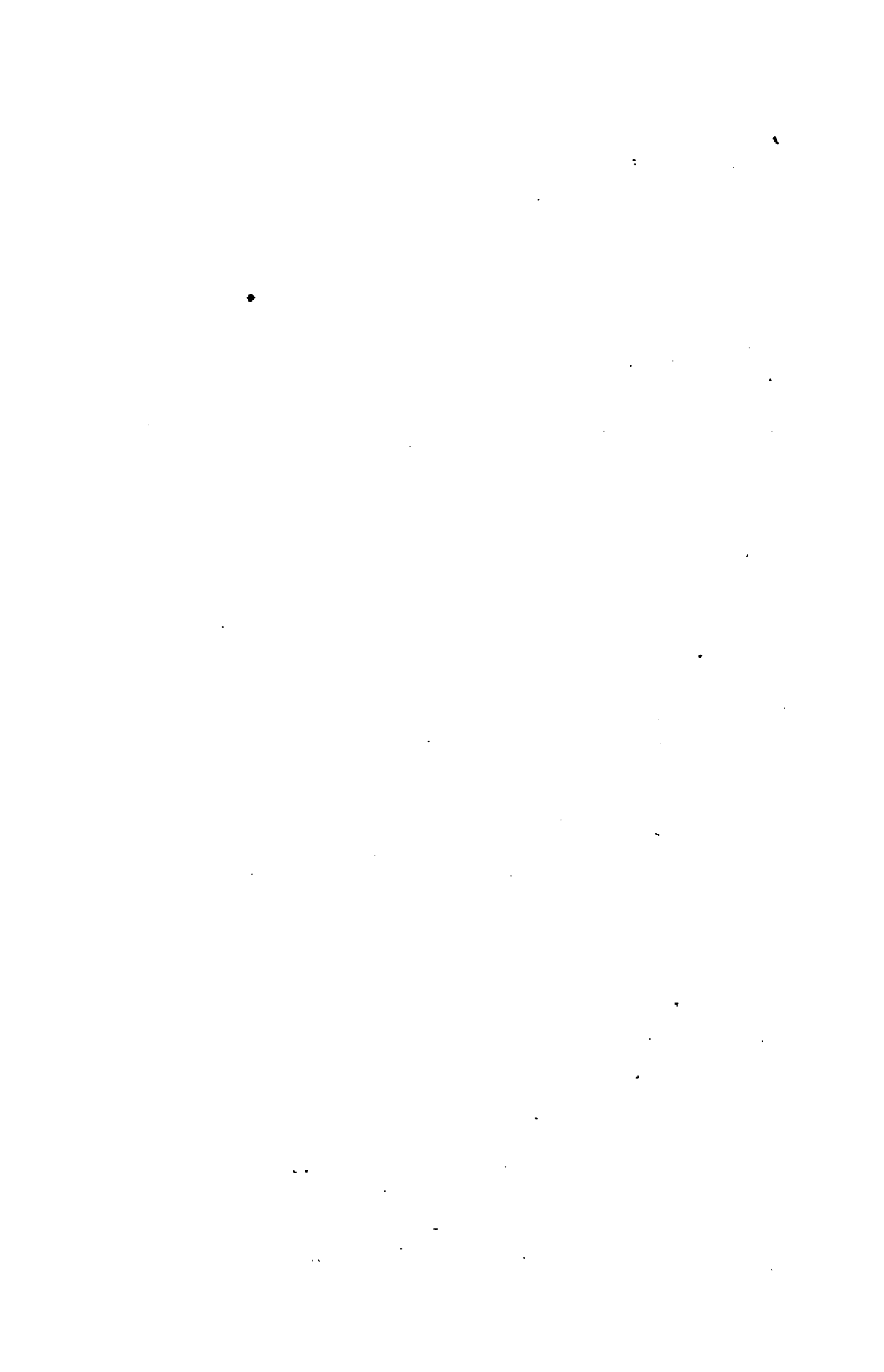
When once the creator has coerced man into the path of progress he has sufficiently provided his creature with means to pursue it and no subsidiary inspiration is granted. Man is fretful, but God is calm. When He created the seas and the dry land and placed man endowed with reason and a perfect organization upon it, He knew that in due time man would contrive the plough and launch his ships.

We have thus seen that the supreme ruler has not laid out so deficient a plan of civilisation, that continued inspiration became necessary; nor that we must claim for human wit what belongs to divine wisdom,† and that in these as in all other cases of divine government into which an insight is vouchsafed us, we find that the creator effects mighty ends by principles and laws of sublime simplicity, working unfailingly in grandeur and calmness.

END.

* The first phonetic signs which the Egyptians used were images of those things whose names began with the letter which it was desirable to represent. They could therefore designate the same sound in many different ways. Adopting the same method for our tongue, we might indicate the single sound L. by sketching the image of a lamb, lamp, leaf, last, lion, ladder, laurel, &c; because all begin with the liquid L. Gradually the easiest among these sketches would be exclusively used and its shape would soon be reduced to such simplicity that the few remaining strokes would bear little resemblance to the original, although the name of the letter remained the same with the thing which they first designated. The names of the characters of the Hebrew alphabet indicate things such as hand, &c.

† *Claim for human wit what belongs to divine wisdom.* I have an impression that this sentence is not my own; but I am unable to remember where I have met with it, or what passage may have suggested it to my mind.



THE LAWS OF CIVILIZATION.

THE SUBSTANCE
OF
AN ADDRESS

DELIVERED ON
SEVERAL OCCASIONS DURING THE SUMMER OF 1860.

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INTRODUCTORY NOTE.

THE following Essay appears as an article in the November number of the *AMERICAN THEOLOGICAL REVIEW*. In its original form, it was delivered as an Address before the Phi Beta Kappa Society of the Wesleyan University, Middletown, Ct., June 19th; the Phi Beta Kappa Society of the New-York City University, June 20th; the Mount Holyoke Female Seminary, South-Hadley, Mass., July 26th; and the Maine Historical Society, Brunswick, Me., August 2d, 1860. On each of these occasions a copy was requested for the press. In now giving this essay to the public in the style and manner best suiting his own convenience, the author hopes he is meeting substantially the wishes so kindly expressed for its separate publication.

R. D. H.

Union Theological Seminary, }
New-York, Oct. 15, 1860. }

THE LAWS OF CIVILIZATION.

WHILE it has been a question with some whether there be any such thing as an exact philosophy of history either attained or attainable, the fact is patent that there are very few men in any grade of culture, or in any walk of life, wholly without a philosophy of some sort, better or poorer, more or less distinctly outlined, and more or less consciously entertained, underlying all their meditations upon human character and destiny. Our choice must therefore lie, not between philosophy and no philosophy, but between the philosophies themselves. In the present essay it is proposed to investigate the laws of civilization as disclosed in the genius and achievements of the historic races and nations of the earth.

Of well-defined opinions on this subject, which must be pronounced erroneous, there are three great types. First, and most imposing of all, the Pantheistic, which rules finite freedom, in any just sense of this term, entirely out of the problem; making human history, with all its reputed blunders and abominations, a Divine, a necessary and therefore an unimpeachable process. Secondly, the Humanitarian, which, on the other hand, rules Divine Providence out of the problem; making human history a motley procession of follies, crimes and sufferings, set off here and there by redeeming heroisms, but from first to last, a mere succession without a method or a goal. And thirdly, what may be called the Materialistic, finding its most ambitious utterance in the recent remarkable work of Henry Thomas Buckle, which rules out of the problem both the freedom of man and the Providence of God, branding them as metaphysical dogmas, disowned of the in-

ductive philosophy; subjugating all things to mere natural law, and thus making human history what is arrogantly called a "Positive Science," in the face and eyes of a vast multitude of positive facts.

These three types of opinion, so discordant in other respects, agree in this, that barbarism, or something closely akin to it, was the primitive estate of man, giving place here and there, now and then, to civilization, as worm to butterfly, as night to morning. Civilization, come whence it may, whether of Divine impulse, of human aspiration, or of mere external conditions, is, in any case, the second comer, and not the first. This is an ancient notion, plausibly suggested by a superficial inspection of history; has insinuated itself into many literatures, as for example the "*Mutum et turpe pecus*" of the Roman satirist; and is, at this moment, in the crude, lax thinking of our time, far more widely prevalent than is creditable either to our science or our faith.

The true philosophy of history stands equally opposed to all these theories, and yet accepts from each its solitary element of truth. With the Pantheistic philosophy it agrees in affirming a Divine intelligence, and the working of a Divine efficiency, throughout the historic course. With the Humanitarian it agrees in affirming a finite freedom, counterworking the Divine efficiency. With the Materialistic it agrees in admitting the force of outward circumstances, such as climate, soil, food and the general aspect of nature, conditioning the character, institutions and fortunes of men. But these diverse forces it blends together into one, not pretending, indeed, to have reconciled them in theory, and yet not presuming to deny their harmony in fact. It detects in every civilization the flavor of the soil which fed its roots; and yet claims for man a supremacy, always potential, though not always realized, over his outward circumstances; while above all, and through all, it discerns a Divine order, holding its firm and stately march from century to century. If man has sunk to be ruled by nature, it is denounced as the shameful abdication of a sovereign. If, by his abuse of moral freedom, he has disturbed the Divine order, and threatened chaos to history, there is no fear

but that the rebellion will at length be quelled and the gracious purposes of God triumphantly accomplished.

Such, in germ, is our theory of civilization: God, man and nature, its perpetually interworking factors; boundless diversity of alternate conquest and defeat, in frequently shifting theatres, its aspect; but progress, on the whole, its law, and a golden age, its end.

The development of this idea of civilization, in any proper fulness, would require a volume, or volumes rather, which could come only of a vast erudition garnered by the diligence of years. But the humblest student may sketch his rude outline of a treatise; stating his points, without being challenged exhaustively to prove them; with the dust of an actual exploration, indeed, upon his sandals, but bringing only clusters of grapes, and not professing to have gathered the vintage.

I. The first great law of civilization, every where discernible and dominant, and every where to be acknowledged by a sound philosophy, is what may be termed the Divine tuition, inspiring and shaping it.

We encounter at the threshold the question of the original estate of man. Was it, as the infidel theories assume, sheer barbarism? Was it, as Bushnell has recently suggested, mere "crude capacity," involving, perhaps, a protracted feebleness of pupilage? Or was it only infancy, more fresh than crude, infolded in the Divine arms, breathed upon by a Divine inspiration, and at once aroused and informed by the lessons of a Divine tuition? These are the three suppositions, or assumptions, if you please: which of them is the right one? Surely, not the first, which propounds barbarism as the primitive estate, since, as Niebuhr, with all the authority justly belonging to such a scholar, has affirmed, there is not in history the record of a single indigenous civilization; there is no where, in any reliable document, the report of any people lifting themselves up out of barbarism. The historic civilizations are all exotic. The torches that blaze along the line of the centuries were kindled, each by the one behind it. Nor yet can we accept the second supposition, which assumes a crude capacity, somewhat tardily developed. It offends our moral

sense, to imagine the human race lying, even for a night, like a poor foundling on the cold door-sill of its future habitation. The third assumption must therefore be the true one. Humanity, we are constrained to believe, was born into its home and passed at once into its Father's arms, taken up, not sternly as Sparta lifted the new-born babe to see whether it might live, or be sent to die on the Taygetus, but with infinite tenderness, immediate provision being made for all its wants. The first man, made outright, must have been more than a puling infant, staring and stammering at what he saw. We need not reckon him a philosopher, but we must believe him to have been a man; somewhat infantile, doubtless, in tone, but not in capacity, nor in the method of his mental growth. Robert South, it may be conceded, has gone too far in asserting, that: "An Aristotle was but the rubbish of an Adam, and Athens but the rudiments of Paradise." And yet he was nearer the truth than some in our day, who speak with condescending, but supercilious, pity of the primal pair. Be it granted, that in the first man, as we may well believe, there was more of intuition than of analysis; more of poetry than of science; more of the passion to acquire than of positive acquirement. Still there remains the problem of mature human faculties, fresh from the hand of the Creator, unclouded as yet by sin, and put to school in a universe, teeming with wonders, and all alive with stimulants to thought. But the great teacher was God himself, who must not, in any scheme of philosophy, be so defined as to rob him of his paternal solicitude for man. What shall be said of human language, that mysterious, subtle, cunning instrument of thought? Science hesitates about its origin, whether to call it Divine or human, and is best satisfied, perhaps, to call it both. The conviction is irresistible, on the basis of any generous conception of God, that man, his "offspring," as Aratus and Cleanthes called him, cannot have been put to his lessons without a teacher, and can have had no other teacher than his Heavenly Father. Civilization, consequently, was no belated and painful achievement of ages, but appeared immediately, as the joint product of God and man, the teacher and the taught. Precisely what form it took, in what lines it moved, and to what lengths it

went, it were idle, of course, to ask. Suffice it know, that every just postulate in philosophy invites us to the conclusion that human history must have had its beginning, not in barbarism, nor yet in mere crude capacity, but in a sensitive, athletic humanity, taking its lessons, whence its life was kindled, from above. All this may be called hypothesis; but surely it is hypothesis resting upon the solid ground of rationality, and not discredited or weakened by any known analogies of history.

But self-consciousness reports a schism within us; a dismal and tragic dissension between the conscience and the will. In the technics of theology, this is known as sin; under its two aspects of generic and individual, distinguished as original and actual. Theology, however, is not responsible for the fact, and is not alone in reporting it. The Greek and Latin classics abound with confessions of human depravity. Plato, in his Dialogue concerning virtue, declares that those who are good are not so by nature, but by what he terms *θεία μοίρα*, a "Divine fate." Aristotle, in his Nicomachean Ethics, assumes the capacity of man for virtue, but recognizes the universality of those evil desires which hinder it. "It is the nature of man to sin," says Thucydides, "both in public and private." Cicero and Seneca are equally emphatic in their confessions. In the Poets, the confession becomes a wailing; as in that famous passage of Ovid: "I would be wise if I could. But a strange power bears me along against my will, desire advising one thing and reason another." Indeed, it was a common saying amongst the Romans: "*Nitimur in vetitum semper cupimusque negata.*"

The origin of this inward schism, as a matter of mere human science, is confessedly ante-historic. Plato wavered in his opinion concerning it, but gravitated towards a sort of Dualism; as, indeed, he was compelled to do, recognizing evil as evil, and not willing to make God the author of it. Philosophy herself must therefore advise us to fly for relief from our perplexity, whither Plato would have rejoiced to fly, to the revelations of Scripture. Here we learn, what no secular history can tell us, but what alone enables us to solve the great riddle of secular history, that the first human pair, in the early

morning of their career, by an abuse of moral freedom, inscrutable to us, fell away from their rectitude, and carried the human race, then in their loins, down with them into sin. . This was the beginning of social decay, the beginning of barbarism, and, had no check been put upon it, would have issued, in no long time, in the utter extinction of the race. Barbarism is not a youthful crudeness, but a decrepitude, of society, not a wild exuberance, but a consumption, of life. Only this consumption, like that of a man's lungs, has its stage of hectic glow, and undiminished fulness of fibre, separated sometimes by quite an interval from the hollow cough, the sunken cheek and the fatal night-sweat. Sometimes, however, the consumption gallops. But slow or quick, it kills. Such is barbarism. Its law is violence, and its end is death. The noblest race of Barbarians who have a name in history, the Germans, overpraised no doubt by Tacitus, would never have civilized themselves, and, but for Christianity, which had as much as it could do to civilize them, would long ago have perished; just as, in spite of Christianity, the Hawaiians of the Pacific, and perhaps, the Aborigines of our own Continent, are now perishing, the physician having arrived too late to save them.

We have thus touched upon that specific form of Divine tuition, which has been the actual inheritance of the race as such. The earlier form of mere paternal superintendence was cut short by sin, before as yet the race had begun to be cradled. Then came that other form, the redemptive, which was at once inaugurated, and which, from then till now, has inspired and determined the whole course of human history. The Serpent-Bruiser was not yet born, was only promised, and foreshadowed by type and symbol; but the Logos economy began to work, and, like the central wheel of some gigantic machinery, sent its motion to the farthest points. Christ began to rule the world long before he entered it through the Virgin's womb. It was he that vitalized the pious civilization of Seth. It was he that cursed the godless race of Cain, and drowned the reeking plains of Western Asia beneath the Deluge. It was he that divided the earth amongst the three great races that came of Noah. It was he that elected the race of Shem as the special nurse and guardian of the great religions of the

world. It was he that appeared to Abraham, and evoked, through him, the Hebrew people to their stupendous destiny. From that hour, till he appeared in person to tread its mountains and its valleys, Palestine became, and remained, the central country of the globe. Diminutive in territory, hardly larger than our own New Hampshire, which it resembles in shape, embraced by the glowing arms of the Desert on the South and East, sentinelled on the North by the rugged mountains of Lebanon, washed on the West by the Mediterranean, with scarcely a single harbor to break the line of its inhospitable coast, it lay apart from the nations, and yet in the midst of them, to be the pivot of their policy, the tempting prize of their ambition, the end for which they flourished, though they knew it not, and through its Prophets, the angel of their doom. Egypt bloomed just in time to adorn the Nomadic Hebrews with science, arts and arms. The Kingdom of Syria was strong just in time to tease, the Assyrian Empire just in time to break in pieces, for Providential ends, the Northern Kingdom of Israel. Then Babylon arose just in time to crush the Southern Kingdom of Judah. The Medo-Persian Empire, intensely hating idolatry, next rushed upon the scene just in time to bear the repentant Hebrews back to Palestine. Then Greece appeared, advancing her breast of flint to shiver the Persian lances, just in time to weave a fitting garment of language for Christian thought. Followed by iron Rome, lacing the conquered world with imperishable roads, teaching the nations law, and shutting the Temple of Janus, to await the coming of the Prince of Peace. Thus all things pointed towards this one issue. There is the unity as of a perfect drama; and the conclusion of every healthy judgment is, that it must have been designed. Rightly, then, did Augustine, thus surveying the grand procession of races and nations, pronounce the history of the world, the history of redemption. No other philosophy of history will answer; no other solution of the problem is valid. Blind must be the student of ancient history, who cannot trace in every land the footprints, and deaf his ears who cannot hear, in every century, the footfalls, of the coming Christ.

None of those antique civilizations were native to the soils

that nourished them. Rome took her light from Greece; Greece from Egypt; Egypt from Western Asia; and Western Asia was where the race was twice cradled, where Adam lived and died, and where the Ark rested. Each of these civilizations, it is true, had something peculiar to itself, in obedience to other laws, which are presently to be considered; but they all proceeded, by natural descent, from one original; and that original was a survivor of the Deluge, the bequest of an elder, perished world, and, in its last analysis, an inspiration of God himself.

The only civilizations, of much historic interest, which failed to play an important part in preparing the way for Christianity, were the Hindoo and the Chinese. Why these had nothing to do, is obvious: They stood apart, outside of the line of march. But neither were *they* indigenous. They both proceeded from Western Asia, shooting eastward, as the more important historic civilizations shot westward, from the central stem.

As to the ordering of these events, thus roughly sketched, the fact of a general Divine superintendence, one would think, is hardly to be questioned. Such adaptations indicate design; and such design necessitates the inference of a competent designer. The only point open to question, is in regard to the mode and measure of that superintendence. The Persian Cyrus, if we allow the authority of the Hebrew Scriptures, was certainly quickened to his work by the touch of prophecy; while the Hebrew history throughout, which, as we have seen, was central to the world, was alive with inspiration. How was it with other nations? But particularly with Greece and Rome? It was a belief of some of the best of the early Fathers of the Church, that, before the coming of Christ, the Logos was busy even amongst the heathen nations of the earth, shining on their altars, guiding their statesmen, inspiring their poets and their sages. St. John was thought to have furnished a warrant for this belief, in what he says of "that light which lighteth every man that cometh into the world." Certain is it, that the ancient heathen systems of philosophy and worship had an air of majesty about them wholly wanting in the modern. From these and other tokens, we think it no idle play of fancy to conclude, that the historic civilizations of the an-

cient world were all of them, not merely branches from a common stock, but were all nourished by a common sap.

The modern civilizations, of which we have not yet spoken, require, in this connection, no elaborate elucidation. Two of them, to which we have barely alluded, the Hindoo and the Chinese, are ancient as well as modern. But these are perishing. The one really puissant civilization, now advancing to universal dominion, is the Christian. Not in its arts, its letters, or its arms, but in its faith, is the hiding of its strength; its banner, the Gospel of Christ; and its motto, that of Constantine: *Ἐν τούτῳ νίκα.*

II. The second great law of civilization, is what may be called its dependence upon the Genius of Race. Of this, Buckle makes no account; but the importance of it is immense.

In speaking of different races of men, we are not to be understood as denying to mankind either unity of species, or unity of origin. Indeed, unity of species is now hardly denied by any one. But we affirm also, with equal decision, unity of origin. It is not enough that we are all of one kind; the instinct of human brotherhood yearns also for a common cradle. With the zoologists, few in number, but of great and deserved repute, who deny unity of origin, our issue must be, that the point in controversy does not belong exclusively, or mainly, to their department of science. Man is, indeed, an animal, but an animal, self-conscious, immortal and accountable; and the adjectives thus employed to describe him, do so exalt the noun they qualify, as to leave the great bulk of the animal kingdom completely under foot. Marshal what analogies you will, they cannot be decisive, so long as the being, towards whom they are directed, transcends their range. From bears and wolves, of several varieties, proceeding from several centres, it cannot be safe to reason up to man. The question must, therefore, be carried higher. Some would make it a question of theology. And so might we in other connections, reasoning backward from the second Adam to the first. But here, and now, we are well content to entertain it simply as a question of history. Historic certainty is, of course, impossible, because the documents are wanting, but, clearly, it is an historic probability,

that mankind are all descended from a single stock, and that that stock was planted in Western Asia. Human traditions, so far as any such traditions are extant, from every point of the compass, all run inward towards Western Asia, as the spokes of a wheel to its hub. And these traditions are strikingly corroborated by the present distribution of the population of the globe. At this hour, more than half our race are in Asia, and more than a fourth in Europe, closely contiguous to Asia, leaving less than a fourth for all the remoter portions of the globe; thus indicating decisively whence these human masses swarmed. Could plurality of origin in any way be *proved*, that, of course, would end the debate. But no proof is offered; only a plausible hypothesis, supported by certain zoological analogies, these analogies irrelevant, and, above all, overruled by the more potent probabilities of history. Hence our faith in the unity of the race; its unity of species, and its unity of origin.

But while there is thus a human race, one in origin, in constitution, and in ultimate destiny, there are also human races, marked by signal diversities of character, leading on to equal diversities of fortune. So great are these diversities, that faith in unity of origin is often sorely staggered. It is a long way down from the merchants, statesmen and scholars of Northern Europe, to the clicking Bushmen of Southern Africa, and the Papuans of the Eastern Archipelago. While all the way along the scale, from top to bottom, are ranged varieties of men, with characteristic peculiarities of color, form, temperament and genius, so positive and constant, that science not only permits, but requires, us to give them the name of races. As to the number of these distinct varieties, or races, of men, ethnologists are not agreed. Cuvier would fix the number at three; Blumenbach at five; Buffon and Prichard at seven; some go as high as fifteen; while Pickering, who sailed round the globe to solve this problem, reports eleven distinct races of men, and declares he does not know where to look for others. Guyot, in recent and as yet unpublished lectures, reckons three "physiological races:" Caucasian, Mongolian and African; with three sub-races: Malay, American and Australian.

For our purposes, still another classification is called for. There are historic races, named by Guyot "psychological races,"

outnumbering the races of physical science, and consequently not coincident with them. As, for instance, in Northern and Central Europe, which has been swept by four successive waves of population: the Iberian, the Keltic, the Teutonic, and the Slavonic, as distinct as so many successive geological formations. While each one of these four great races is, in turn, composed of several subordinate tribes, no more to be confounded than the larger divisions to which they belong. How unlike each other, for example, the Laplander and the Basque; and yet both of them Iberian. How unlike each other the Gael and the Briton; and yet both of them Keltic. How unlike the Saxon and the Norman; and yet both of them Teutonic. How unlike the Croat and the Russian; and yet both of them Slavonic. So, too, in Asia, the Arab and the Hebrew; closely related, yet easily distinguished. So, indeed, the world over. Physical science may deal with these tribes of men as it pleases. Historical science, employing at once a more spiritual standard of judgment, and having more regard to practical results in social and civil life, requires us to treat them as races. Each of them has a genius of its own; a subtle something, which almost eludes analysis, hiding itself away in the depths of character, as heat is hidden in a sun-beam, and yet as ineradicable as the olive complexion of a Chinaman. Belgic bravery, winning the praise of Cæsar, reappears, after sixteen centuries, in the heroism of the Dutch Republic. Strabo's description of Gallic character, published eighteen hundred years ago, would answer well enough for the Frenchman of to-day. In each case, it is the same old blood, beating to the same old measure.

As to the number of these historic races, no estimate need now be offered. In the perpetual flux of history, great changes occur. Old races disappear, and new ones take their places. If a classification were adventured, it must be, as in Gfrörer's *Urgeschichte*, on the basis of the 10th chapter of Genesis. The three great lobes of humanity, Semitic, Hamitic and Japhetic, dating back to the Deluge, are still distinctly discernible. Minor divisions presently appear, sharpening their outlines, clashing, overlapping, blending, until the historic canvas is gay with colors.

The origin of races, is one of the mysteries of science. The material we know: our common humanity, body, soul and spirit. And the forces we know: partly of nature, such as soil and climate; partly of spirit, such as letters and religion. But when the product appears, if we are thoughtful, we stand in awe of it. No augur announces its coming, or can tell its errand. It has a secret, which no interrogation extorts. It is not fully explained by any statement, however exhaustive, either of its outward conditions, or of its impelling ideas. There is also in the problem an element of Providential purpose, which must by no means be overlooked. The ingredients are mixed, and the hour is struck, by an unseen hand. Between the human race in its unity, and the human races in their diversity, there is a difference as great as between the sunlight and the rainbow. With no change of contents, there is a vast change of aspect and of office. Had there been no fall of man, there would have been, perhaps, only the race, in its untroubled, normal development, with only such slight diversities, as might have come from diversities of outward condition. Now, instead of the race, there are races; intensifications, all of them, of certain fragmentary portions of our nature, involving the loss of wholeness and of symmetry. Breaking the unit, we exaggerate the fractions. Losing in weight, we maintain the momentum by increasing the force. Or losing in force, we maintain the momentum by increasing the weight. Power in one direction is purchased at the cost of weakness in another. "Non omnia possumus omnes." And so each race, by Divine appointment, has its own work to do, its own errand to accomplish. The Hamitic race, hot, quick, versatile, leads off for a time in arts and arms; but, presently the glow becomes a fever, imagination masters the judgment, passion debauches conscience, and the plunge is made into barbarism. The elder Babylonian Empire soon passes away, and Egypt becomes in time the basest of kingdoms. The Semitic race, finer in fibre, of purer tastes, more thoughtful, intuitive and reverent, gives birth, indeed, to Phœnician commerce, and, from the shores of Carthage, thunders at the gates of Rome; but, in the main, prefers, even at the risk of historic immobility, to hold its original seat away from the sea, and there nurse the

religions which are to rule the world. The only cosmopolitan religions are the Semitic : Judaism, Christianity and Moham-medanism. Heliopolis was for Egypt, and Delphi for Greece ; but Mecca is for millions of men not Arabs, and Jerusalem is the mother of us all. The Japhetic race, of iron muscle and of iron will, stirred by a mysterious impulse, turns its back upon the seats of rising empire, pushes off northward and westward, into less hospitable climes, and there awaits the later call of Providence. In due time we behold the language and letters of Greece ; Roman roads, legions and laws ; and, finally, the whole life of modern Europe and America, now striking for the dominion of the world. Just now, the race that was first, is last ; and the one that was last, is first. But the day is coming, when all shall enjoy together what each has contributed in its turn to win.

What is thus true of the larger divisions of mankind, is equally true of all. There is that in the Keltic race, for example, distinguishing it from every other, which has always distinguished it, and which inevitably qualifies the career of every nation which has the Keltic blood very largely in its veins. Better was it than the Iberian, or the Iberian would not have retired before it ; but inferior to the Teutonic, or the Teutonic would not have overborne it. Between the Teutonic and the Slavonic, the issue is still impending.

The best races are the amalgams. An unmixed race will never hold its own ; and ordinarily, the deterioration is rapid. Within certain limits, the mixing of races has a tendency to multiply the good points, and eliminate the bad ones. As in France, where the modern Frenchman is better than either the Kelt, the Frank, or the Norman, of whom mainly he has been composed. As in the England of to-day, so greatly in advance of the England of Arthur, of Alfred, or of the Norman Conqueror. As in North America, where Providence is now preparing a new amalgam, which appears to have forces in it, and a destiny before it, more grand than either of its European ingredients.

Unquestionably there is much in blood. There are things which can never be taught, and never learned ; but if ever put into men, must go into them before they are born. The

proper use of the ballot-box is one of these things. The Frenchman and the German try in vain to learn it. The born Englishman or American takes to it, as the lark to the morning-sky. Germany, overrunning with scholars, fails to beget a Parliament. France with the stamp of her foot calls splendid armies to the field ; but her colonies are imbecile. As Lieber has lately shown, the only proper self-government in the world, is Anglican. This comes in part of the happy blending of races ; but comes also of time gradually working its lessons into our very marrow and our blood.

III. The third great law of civilization, is what may be termed the shaping pressure of its outward conditions ; which have been reduced to four : climate, soil, food and the general aspect of nature.

Physical *causes*, these are ordinarily called ; but if man be really endowed, as he appears to be, with moral freedom, they are not properly causes, but only conditions, of human development. A material embodiment like this of ours, involves, of necessity, more or less of dependence upon nature. The earth and sky must, in any case, have played their forces upon us, belting humanity, as they have belted the globe, with zones. But man was made to be superior to nature, successfully achieving his destiny on any continent, or island, in any latitude he might select for himself between the equator and the poles. It was no part of the original economy of things, that the Tropical man should become a Hottentot, or the Arctic man an Esquimaux. The iron will of the youthful Kane, enshrined in a delicate body, defying the rigors of an Arctic winter, may help us to imagine, what might have been our relations to nature, but for the damage done us by the fall. But now it is an impaired humanity which has peopled, and is peopling, the globe. The will of man, in succumbing to moral evil, has succumbed also to nature. He trembles in her presence like a king dethroned, and dragged through the streets of his capital by an angry mob. He is overawed by whatever is grand in nature : the ocean, the desert, the mountain, the forest, the cataract and the starry night. He is appalled by whatever is terrible : the earthquake, the drought, the deluge,

the lightning and the hurricane. And seduced by whatever is soft and fragrant: the languid sky, the billowy landscape and the spicy breeze. Hence the bondage of man to nature; sometimes nearly complete, as in those human races, which have gone down so nearly to the level of the brutes, indolently taking for their food the spontaneous products of the earth, with no bridle upon their appetites, and no end to the madness of their lusts but in rottenness and death; sometimes only partial, but always more or less in exact proportion to what remains of the original humanity.

There is a proper influence of nature upon man, which may be permitted without abasement. Adam himself, in Paradise, must needs have been responsive to the outward conditions of his lot. But he should have paced his garden as a king. And when his offspring went abroad in quest of other climates, milder or sterner, they should have borne the sceptre with them. Even sin, when it fell upon the nascent race, followed and balanced, as it was so promptly, by redemption, was no annihilation of the royal prerogative. Humanity was not destroyed, but only deranged and weakened. The derangement, it is true, was great. The regal estate was menaced, the dominion over nature disputed, and a stern conflict imposed as the price of victory. The temperate zone offered, no doubt, the easiest and most auspicious theatre for man; at once requiring and rewarding his toil; neither coaxing him into a relaxed and effeminate barbarism, nor frowning him into a hard and brutal barbarism. Even there, under the happiest conditions, infirm as he was, the battle was liable, of course, to go against him; but quite sure to go against him, if he plunged precipitately, either into the lap of fire, which waited for him in the South, or into the lap of frost, which waited for him in the North. Both these plunges were made: into the lap of fire, by a portion of the descendants of Ham; into the lap of frost, by a portion of the descendants of Japhet. And the penalty of both was barbarism: to the descendants of Ham, a barbarism not yet conquered; to the descendants of Japhet, a barbarism, whose conquest has been one of the proudest trophies of our religion. Universal conquest, we know, is possible, because the two extremes have already been touched.

The torrid home of the Zulu, and the icy den of the Greenlander, have both resounded with the accents of our Christian worship.

As we have said before, Noah, the second father of mankind, was no barbarian. He brought forth out of the Ark, what he had carried into it, the civilization of the elder world, which had come down, through sharp conflicts, from the gates of Paradise. The problem was, to keep it; and not to keep it only, but also to enrich it with the spoils of every clime, into which its victorious banner might be carried. The struggle will be severe, and the theatre of this civilization must, therefore, be wisely chosen; not in the extreme North, where eternal winter will freeze it, nor in the extreme South, where eternal summer will dissolve it, into barbarism; but in the temperate middle zone, neither North nor South, where man and nature may wage a more equal strife.

And so it was. The historic civilizations have been neither Tropical, Arctic, nor Antarctic, but Temperate. And, furthermore, for ages, till Persia and Greece succeeded to the inheritance, they clung tenaciously to the fertile valleys of the globe. The Babylonian civilization struck its roots on the banks of the Euphrates; the Assyrian, on the banks of the Tigris; the Egyptian, on the banks of the Nile. And had we time, it would be easy to show the indebtedness of all these civilizations to the valleys, in which they flourished. Only there, and thus, could they have run their course. The garden was sheltered, the soil was rich, and the growth was rank. But the fibre was soft, and the lordly trees, struck by tempests from the hills, went down with a resounding crash.

With the fall of Persia, the grand historic drama was shifted to another continent. Europe is now its theatre. And with this change of theatre, there is also a change of method. The Asiatic civilizations have been too passive, too much enthralled by nature, tasting too rankly of the soil. In Europe, a harder soil must drive the life of the race more up into the air for nutriment. Man must get the better of nature, ceasing to adore it as Divine, even at the risk of making himself a god. He must cease from his idolatry of the stars, the mountains, and the streams, even at the risk of worshipping the dead heroes

of his own mortal race. Such was the mission of Greece. And yet the Grecian civilization, intensely human as it was, was conditioned by its geography. A little kingdom, not larger than the State of Maine, but enriched with every variety of soil and surface; deeply pierced on either side by the Adriatic and the Ægean, as though they would sting it into life; lifting itself in mountain ranges to be crowned with eternal ice; stooping, in its valleys, to be decked with eternal bloom; its hill-sides yielding honey to the bee, and marble to the sculptor; its nineteen districts, or counties as we should call them, so divided from each other by the hand of nature, as to give to the inhabitants of each institutions and a genius of their own; sometimes so confederated as to be a unit, and defy the world; but oftener chafing, in fatal rivalry, which invites aggression from abroad, till at length the Macedonian phalanx trampled them like grass; never, in all the tide of time, was there a kingdom, whose history was more indisputably conditioned by the theatre in which it moved.

The other leading civilizations of Europe—Italian, German, Gallic, British—had we time to analyze them, would yield a similar result. With a life in them superior to nature, such as no Asiatic civilization ever had, they have yet been colored by the soil from which they sprang, and bent to their shape by the winds which have played upon them out of the sky, into which they have shot their majestic growth.

Crossing the Atlantic, in the wake of the European migrations, it would be easy to show how our own history has been conditioned in the past, and must be conditioned in the future, by the great features of the continent on which we dwell. The vast oceans on either side of us, highways to Europe and Asia, towards which, by the line of our mountain ranges, we slope eastward and westward; the Lakes above and the Gulf below us; our gigantic rivers clasping the continent from North to South with their shining arms; our imperial prairies, teeming with more than Egyptian plenty; and, over all, our keen and eager climate: these are features which must set their seal upon our destiny.

No where and never can it be a matter of indifference, whether a civilization be continental or insular; whether its

theatre be flat or mountainous; its soil sterile or fruitful; its productions few or various; its climate Bœotian or Attic. It is true, man is no vassal of nature. With a civilization in his soul, he can root it where he will; in the sands of a desert, or amidst the snow-banks of Greenland. But it is also true, that he can root it better on a broad and fertile continent, over-arched by a brilliant and genial sky.

IV. The fourth great law of civilization, is its dependence upon moral stamina.

That which first impresses every youthful observer, is the frequent shifting of the historic theatre, consequent upon the decay of nations and races. From the Euphrates to the Nile, from the Nile to the Ægean, from the Ægean to the Tiber, from the Tiber to the Rhine, the Seine and the Thames, through more than four thousand years, there has been a steady drift, as if upon some mysterious electric tide, following on after the sun in his westward march. Civilization, it is true, has never perished; but many civilizations have foundered. New races have appeared, and new nations have come to the rescue, only in their turn to be struck by decay, and stagger to ruin. The earth is a vast graveyard of institutions, politics and cultures, as well as of men. And we have heard it said, that the law is the same for both; that as the individual is born, advances to manhood, declines and dies, so races and nations tread their appointed round of youthful vigor, proud maturity, and pitiful decay.

But this is a totally false conception of history. It is only the individual that dies, not the race. Generations come and go, but the vital continuity survives. Constant dying is there; but also a constant succession of renewed and ever renewing life. The drops run past us, but the river stays:

Labitur et labetur in omne volubilis ævum.

If thus the race continues, why may not a nation likewise? It surely may. Certainly there is nothing inherently forbidding it. If it be true, as in a certain sense it is, that the human race is as young and fresh to-day as ever it was, and can never be old, so long as new generations continue to be cradled in its

arms ; it is equally true, that a nation also need never be old. This human race, it is said, is old ; but it is also young. The child that is born to-day, comes just as plump and eager to its mother's bosom, as the child that was born a thousand years ago. Its manhood, too, may be as robust, and its destiny as grand. And, in the nature of things there is no reason whatever, why this renewal of lusty life may not keep on repeating itself interminably ; no reason whatever, why a nation in all the functions, and for all the purposes, of national existence, may not be as ruddy and athletic at the end, as at the beginning, of a hundred, or a thousand, or even ten thousand, years.

Why, then, do races and nations perish ? Why have the names of Chaldea, Assyria and Egypt been starred upon the Catalogue of nations ? Children still continue to be born, and lullabies may still be heard upon the banks of the Euphrates, the Tigris and the Nile. Why, since the people are living, have the nations died ? One verdict will answer for them all ; one verdict, and one epitaph. To say all in a single word, they died of immorality ; and immorality is suicide. Seldom do nations die in any other way than by suicide. National assassination is a rare atrocity. There may be here and there an obscure exception, but, in general, the nations that are dead, have died by their own hands. Suicide is the method ; poison, the instrument ; and the poison, lust. The agony may be longer or shorter, but the end is certain. Sooner or later, they all take the advice of Job's wife, which Job did not take : " Curse God, and die."

Sin, it can hardly need to be said, is the fontal beginning of national decay ; sin in the heart, sending out immorality into the life. But sin is human ; and more or less of immorality must always attend the career of nations. Somewhat of immorality, doubtless, there may be without a fatal result. But the one offence, which is never pardoned in history, and which no nation ever survives, is the offence of gross and universal unchastity. Just this, preëminently, is the rottenness, of which the nations have died. Not this alone, for it never can be alone ; but this as the type at once, and the culmination, of their depravity. So died all the Asiatic civilizations ; sliding down a slimy path into a slimy grave. So died Rome, in

spite of her Christian baptism. The Teutons, who found her tottering, weak in the loins, behind her battlements, and smote her between the joints of her harness, with all their barbaric vices, had this one conspicuous virtue, that they were chaste. Even when they rushed to battle, the tribe went all together, moving in families ; and their women were revered as oracles. The Keltic race were not thus chaste. Hence the election of Providence, bringing in the Teutonic blood to reinvigorate a decaying Christendom, and transmit to modern times the intellectual and æsthetic treasures of Greece and Rome.

The prolonged prosperity of races and nations essentially demoralized, so frequently alleged, would, if it were true, completely overturn our faith in the divine justice. If there be no righteous judgment in history, we have no rational ground, on which to expect it any where else. If the tree does not fall when rotten from bark to core, then rottenness is not abhorrent to nature. If nations do not perish of lust and violence, then lust and violence are not offensive to God. But there are no such facts. The rotten tree does fall ; the debauched and cruel nation does die. There is a Nemesis in history, never cheated of its vengeance. Nations that are bad may be employed by Providence, as every nation has been employed in its turn ; but it may be only as brooms to sweep the streets of the Holy City. The service rendered, not being a voluntary service, brings no honor to the instrument. The use God made of Egypt, Assyria and Babylon, was nothing for them to boast of. They stood simply upon their own moral character ; and when this, by steady decline, had reached a certain point of baseness, they collapsed and fell.

How much there must be of moral putrefaction before the vultures of Providence begin to scent their prey, it is not easy to say. The problems of history are all complex. Nations sometimes hold out longer than we should think they could. There may be reasons of state on the part of the King of kings, withholding the bolts, which might justly fall. There may be a hidden vigor of stock, maintaining a stout resistance to decay. There may be outward conditions, conspiring to prolong the shattered and sinking life. But the tendency is always to ruin ; and sooner or later must the goal be reached.

The civilization of China is frequently spoken of as one of the marvels of history. A marvel surely it is, but no impeachment of a wakeful and jealous Providence. As old, almost, as the time of Noah, this singular civilization, though doubtless decaying, is hardly yet in its decrepitude. What means it? Doubtless, some account must be made of blood. Some account must also be made of geographic isolation, shielding the nation from the shocks and surges of war. But the main secret of this unparalleled longevity, is moral stamina. The Chinese are not a religious people. The system of Confucius is merely ethical. But the ethics are good, inculcating reverence for parents as the beginning and basis of all virtue. Hence the nation endures, rooted in the family; and its hoary age is but the blessing promised to filial obedience.

Traverse now the map of the old world, and look on England. More than fourteen hundred years have passed since the last of the Roman legions sailed away, leaving that little Keltic island to its fate. More than a thousand years have passed since Egbert moulded the eight little kingdoms into one. Do you call that kingdom old? As Brownson has lately said, there is not a single wrinkle upon its brow. Whence, now, this green old age? It comes, in part, of the Divine purpose, electing whom it will for the grand achievements of history. Partly of race, composed and attempered as never any race in Asia, or Europe, was composed and attempered before it. Partly of position, climate and physical resources,

For ocean, 'mid her uproar wild,
Speaks safety to her island child.

But, above all, it comes of a moral stamina, unequalled in Europe, which, in the hiding of its strength, is first Christian and then Protestant.

But we are Americans. And what is the horoscope of that future, to which our continent belongs, and for which we live? We are here, by the ordering of Providence, in charge of the final theatre and the final problems of history. In race, we are an amalgam of more and better constituents than were ever before subdued and welded together. Attenuated in physical constitution we doubtless are, in obedience to certain

physical influences operating upon us, but supple, athletic and forceful beyond all European rivalry ; in peace, prolific of all useful inventions looking towards the mastery of nature and the accumulation of wealth ; in war, when war is forced upon us, uniting the spring of the panther with the stroke of the thunderbolt. In the outward conditions of our lot, we have all that history could ask. It is for ourselves to say, whether, for our frivolities, our follies and our crimes, the Providence, that set us here, shall pluck us up and dash us in pieces against our own mountains ; or, whether, by a generous culture of ourselves in all liberal arts, preferring substance to show, worth to wealth, and above all, by those sturdy moral virtues begotten only of a positive Christian belief, we may not hold our ground here, puissant and respected amongst the nations of the earth, till the trumpet of God's providence announces the final triumph of universal justice, freedom, truth and love.

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AN ESSAY

READ BY

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F.R.S., &c., &c.,

BEFORE THE

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ON THE RELATIONS OF SCIENCE TO MODERN CIVILIZATION.

MR. PRESIDENT, LADIES, AND GENTLEMEN :—

WERE man's mastery over matter taken as the measure of civilization, no one could entertain a doubt as to the place which science should hold among the agencies for the improvement of our race. Let a student of science lay aside his usual labours, and become a close observer of the operations which have rendered this town famous among the centres of modern industrial development, and he will encounter on every side applications flowing from philosophical principles. Results which, in the eyes of their discoverers, possessed speculative value alone, would be seen to have fruitfully contributed to our material welfare. The majority of those who value knowledge do so on this ground, but all who love knowledge are also attracted by its intrinsic excellence.

More than a century has elapsed since a celebrated provincial academy, in a neighbouring country, bestowed a prize upon a dissertation emanating from one of the ablest sophists of modern times. But no one was convinced by the ingenious arguments and fervid declamation of Rousseau. No one could believe that the sciences and arts tended, upon the whole, towards the moral degradation of man. The Academy of Dijon, practically repudiated their prize-essay by continuing to act in diametrical opposition to its conclusions: they did not burn their archives or their library; they did not cease to pursue their learned researches; they still continued actively to diffuse their various contributions to the sum of human knowledge.

The universal negation of Rousseau's proposition as to the injurious influence of science, the circumstance that his arguments could not now be quoted, except to show their fallacy, or as exercises to students of logic in the detection of a peculiar class of sophisms, would seem to render my present task altogether superfluous.

The civilizing influence of science is acknowledged wherever science is known, but the nature of its operations does not seem to be so generally understood. Even among civilized communities themselves, this influence is very frequently supposed to be chiefly of a material character. Almost every mind is awake to the palpable influences of the great masterpieces of engineering skill. A moderate acquaintance with physical science enables any one to perceive that the steam-engine, whether stationary, or propelling matter over land or sea, together with all those innumerable contrivances in which it is the moving power in the factory and the mine, must have required for their evolution profound meditation and patient inductive reasoning, as well as the discovery of the laws of material phenomena abstracted from all practical applications. The impressive nature of such applications thus leads to the inference that they alone constitute the civilizing influence of scientific labours. I propose to show that this forms only one portion of the civilizing action of science.

If "*knowledge is power*," it seems absurd to limit such an essentially mental power solely to material results. When we take a rapid glance at its general influence on human society, we soon perceive that the knowledge of nature increases and spreads wherever civilization is highly developed. In this respect it is often a product as well as a cause of civilization. In order to more clearly understand this point, let us try to form a definition of civilization. Let us recollect that we are inhabitants of a planet on which we dwell in company with tribes of living beings, of orders greatly inferior to ourselves in the scale of creation. Like them, our existence demands some palpable and imperious physical requirements. Some of the more intelligent of these creatures display, at least, as much ability in providing for the satisfaction of their wants as the more barbarous portions of the human race. Industrious, and comparatively cultivated nations may, even with greater propriety, be considered as approaching closer to the bee or the beaver type, than slothful and stupid savages. Were we all to value knowledge only for its utility in satisfying our material wants, we should still more closely resemble the bee or the beaver type. But we possess a searching tendency,—a thirst after knowledge, altogether independent of animal wants; and it is this circumstance that constitutes the most marked distinction between man and the brute tribes. This inherent quality of the human soul most strongly exhibits the stamp of its Celestial origin. No animal type corresponds to the group of mankind to whom knowledge is valuable for

itself. This, therefore, constitutes the highest type of human cultivation. True civilization, though intimately and necessarily connected with the accumulation of the material results of knowledge, cannot be so clearly measured by these results as it is by the development and diffusion of those truths that constitute the purest delight of thinking beings. A nation is civilized in proportion to the number of active, healthy minds which it possesses,—in proportion to the number of cultivated persons who obtain their highest and most enduring pleasures in the constant culture of the intellect.

Those countries, whether of ancient or of modern times, which we have been accustomed to regard as the most civilized, are all rigorously comprehended within this definition. It will be found to apply even to different parts of the same country. The capitals, during the earlier epochs of history, and the university towns, together with the seats of government, during the middle ages, were the most prominent seats of civilization. But in our day they share this eminence with many a centre of industrial art, where the very requirements of material development constantly call for a corresponding degree of mental activity. The highly scientific character of a great portion of our industrial arts necessarily brings such pursuits into the closest contact with those which are purely intellectual, both in their methods and their objects. This result is wholly connected with science; for science is essentially twofold in its influence on our race, in simultaneously providing satisfaction both for material and intellectual requirements. It can scarcely contribute to the gratification of the one, without, in some measure, also satisfying the other. This twofold action may be separated by a narrow or by a wide interval. The discoveries of *Ørsted* were soon followed by the realization of the electric telegraph; while two thousand years rolled away before some speculation on those curious curves, formed by sections of a plane with a cone, resulted in the profound mathematical investigation on which the accuracy of those nautical tables depends, upon which the mariner securely relies for correctly steering his path across the ocean.

The study of modern history serves to confirm the views here taken of civilization. If the tendency of man is, upon the whole, directed towards the elevation and perfection of his higher faculties, it follows that such epochs as were marked by advances in the direction of culture must possess the deepest interest to the student of history. There could scarcely be a more wearisome kind of study proposed to the majority of general readers, than the annals of some modern nation during that remote and barbaric period when its

records exhibit nothing but pictures of battles, massacres, and famines. The most barbarous nations are precisely those whose history is at the same time most replete with such events, and at the same time most thoroughly tiresome. Some one has said, "Happy must be the country whose history is uninteresting!" In other words he meant to say, Happy is the nation whose tame annals display but little of state intrigues, of wars, cruelties, or assassinations! But, if history is frequently the record of such events, it is not on those occasions that it presents us with its most interesting spectacles. Let us ask ourselves what are the countries whose records we peruse with the deepest interest? To what does a little peninsula in the south-east corner of Europe, owe its pre-eminent interest over other ancient countries? It had its wars, its intrigues, its domestic tyrannies, as well as the most barbarous of contemporary nations. In one point it was distinguished from almost every other country: it was the home of philosophy and art, and the seat of the Academy and the Lyceum; it was the centre whence emanated almost all the art, literature, and science of its epoch. We still continue to borrow our most emphatic figurative expressions for the highest kinds of intellectual culture from its springs, its rivers, and its mountains. When we peruse the history of other countries, as well as that of Greece, do we not find the greatest charm in the pages of those writers who most prominently treat of the operations of letters, science, and art, in transforming and advancing nations devoted to their culture?

The ages of Leo X. and of Louis XIV., of Elizabeth and of Anne, have inspired some of the noblest pages of modern historical writers. Even the imperfect civilization of Mexico and Peru at the period when conquered by Europeans, has furnished some of the most beautiful episodes in the writings of a recent historian. The most deeply interesting battles which are described in the pages of history, are the ceaseless conflicts between civilization and barbarism. While perusing that work which so eloquently records the decline and fall of the most powerful empire of antiquity, do we not become conscious, that while Roman civilization was gradually fading away, new powers were developed which were ultimately to influence with redoubled energy the growth of fresh nations? Were the task of the historian confined to tracing the triumphs of barbaric hordes, he would not find it easy to command the constant interest of his readers. When contemplating the comparative lull of human genius during the middle ages, how strongly our attention is excited by the smallest discovery, by the most trifling effort to

revive the flame of science! From those days we trace the introduction into Europe of one of the most characteristic, intellectual instruments of science,—the so-called Arabic system of numerals. These familiar symbols admirably illustrate the cosmopolitan character of science; for they form, by far, the most important part of the universal language of calculations. I am induced to dwell upon this subject, for it will appear that some of the most salutary influences of science are directly derived from its essentially cosmopolitan character. If we look around us, and study as far as possible the cultivated condition of existing nations, we can scarcely avoid coming to the conclusion, that over equal areas of territory, and with equal masses of population, the highest degree of civilization exists in those countries where the greatest unity of language, laws, and customs, is found to prevail. On the contrary, wherever a great number of widely-different dialects, strange provincialisms of language and manners are observed, there civilization is imperfectly developed. The original sources of those successive tides of barbarism, which swept over the Roman empire at the period of its decline, are chiefly traceable to the great steppes on the confines of Europe and Asia, which lie to the east of the Black Sea. This is precisely the quarter indicated as presenting the widest field for a certain class of ethnological researches. The multiplicity of languages among the different races has been long deemed so extraordinary and so perplexing, as to render a numerous band of skilful interpreters indispensable for travellers attempting to hold intercourse with these remote regions. Thus, among the innumerable tribes of Tartar origin, which are grouped beneath the Russian, Persian, and Ottoman sceptres, great diversities and corresponding barbarism constantly co-exist. Excepting a few abnormal instances found among the lowliest ranks of their populations, precisely the opposite law holds throughout Germany, France, Italy, and the British Islands. In Germany the conditions existing among the eastern nations are reversed; for instead of finding various hordes speaking different languages, and employing different customs, while yet collected together under the sway of a single powerful empire, we observe a highly cultivated people holding mutual communication through the medium of one Teutonic tongue, animated by similar philosophical and æsthetic tendencies, and yet harmoniously grouped under a multitude of independent governments. It is in vain to remind us that in remote quarters of these cultivated communities, some scattered portions yet retain their semi-barbarous dialects and usages. Such exceptions only tend more strongly to prove the

truth of my conclusions, for such peculiarities exist only among the least civilized individuals belonging to these favoured nations.

If we go backwards a century from the present day,—if we examine the records of our own country, our local histories, our collections of epistolary correspondence, our dramas and romances, we shall find the comparatively imperfect civilization of the times everywhere depicted in close alliance with provincialism. Fielding has admirably sketched this peculiarity in his “Squire Western,” as well as in other less energetic personages of his fictions. The most amiable character who speaks to us from the pages of one of Fielding’s contemporaries, “Uncle Toby,” is, on the contrary, eminently cosmopolitan as well as thoroughly English. Since the period referred to, a multitude of causes have been in operation whereby the provincial peculiarities of the inhabitants of these islands have been gradually smoothed away, and whereby they are now more perfectly amalgamated into one homogeneous vital mass. The same process has been actively at work in neighbouring countries; and it must be acknowledged to assist everywhere in promoting those amenities which add the greatest charm to the present state of our existence.

Of all the pursuits that can occupy man, science is that which, both in its speculative and its practical results, is the most essentially cosmopolitan. There may be a French drama and an English drama, German as well as Italian styles of art, classical and romantic schools of poetry, but there can be only one kind of science. A mathematical proposition would be as quickly appreciated by a thinking being in the remotest planet, as well as among ourselves. Some one formerly proposed the strange project of a telegraphic system of communication with the supposed inhabitants of our satellite, founded upon the necessary cosmopolitan nature of geometry. If beings, similarly endowed with intellect as ourselves, did exist upon the moon, it is easy to conceive how illuminated geometrical figures might be combined in such a way as to attract their attention. Combinations of such figures, together with algebraical and mathematical symbols, constitute not only the nearest approach to an universal language which we possess, but they represent trains of thought which, at all times and everywhere, proceed according to the same laws. One of the greatest masters of this powerful instrument declares, that no language could be more simple and more universal, more exempt from errors and obscurities, and, consequently, none more fitted to express the invariable relations of phenomena. Thus, mathematical

analysis is co-extensive with nature, by defining all sensible relations,—measuring space and time, forces and temperatures, with an exactness and precision that becomes more and more perfect every day, and which is entirely independent of the passing variations and errors of human opinion.

The cosmopolitan nature of mathematics extends, not only in the ordinary sense to time and space, it exists, so to speak, with reference to the very objects of its application. In all, a similar language is used for the interpretation of phenomena; thus illustrating the objective unity of the exterior universe which forms the matter of our contemplation, as well as the subjective unity of the contemplating mind. But the cosmopolitan character of science is seen not alone in mathematics, it is strongly developed in every portion of exact knowledge. The general affections of matter are equally interesting to all men. All are linked in a common bond of intellectual interest by a discovery of some new properties of the substances that form our earthly habitation, or by additions to our knowledge regarding those bodies among which we circulate in space. No nationality or provincialism can be admitted into the arena of science. The *Principia* and the *Mécanique Celeste*, belong as much to all nations as the bodies whose figures and motions are investigated in those immortal works. It is almost superfluous to refer to the material manifestations of the cosmopolitan influence of science. Nothing, as remarked by Humboldt, more largely contributed to the growth of early civilization among the Hellenic races than the peculiar structure of Greece, with its numerous peninsulas and promontories, the scattered groups of islands in the Egean sea, and the correspondingly broken structure of the portions of Asia in its immediate neighbourhood. The influence of inland seas, as connecting elements, was elsewhere strengthened by the similar action of great rivers, possessing deep channels and moderately sloping surfaces, whereby means of internal communication were opened up at an early date among the most civilized countries of the East. In recent times nothing has more powerfully contributed to the destruction of provincial barriers than the increased resources which science has placed at our command for the purposes of locomotion. Every year witnesses extensions of the same facilities; not only within different nations, but between their leading outports. Every year the earth is becoming more completely girded by networks of railways: already lines of steamships are converting certain portions of our oceans and seas into great ferries; and the rapid spread of the electric telegraph is still more perfectly

uniting the various families of our race. Those great provinces of the world called nations must thus assuredly lose some of their provincialisms, while receiving in exchange whatever is good among the general qualities of their neighbours. No one can overlook the political as well as the physical tendencies in this direction at the present moment. I need only recall the movements in progress towards the extinction of the passport system, the improvement of international postal services, the reduction of tariffs, the establishing of uniformity in coins, weights, and measures: all of these results flow more or less from the influence of science, and they will all in turn assist in further advancing the source of power from which their origin can be traced. If science necessarily strengthens the internal energy of the human mind, by affording an eminently suitable and thoroughly efficient exercise, it may be said to almost indefinitely extend those powers by which we hold communication with the outer world. Our range of vision has been in this way immeasurably enlarged by the telescope and microscope: ingenious acoustic instruments enable us to appreciate, to study, and record, sounds which could never be mastered by our unassisted ears; variations of temperature, electricity, and magnetism are now made sensible to observation by delicate contrivances, long before our unassisted senses could take any note of such changes. Compared with our forefathers, only a few centuries since, we are in the position of beings with intense perceptive faculties. Science has thus enlarged our powers to gigantic dimensions, and opened both for us and for future races fresh avenues for the inflow of ideas from the outer kingdom of nature.

If the cosmopolitan character of science is one of its distinctive features, science is not less marked by the permanency of all its real acquisitions. On this point I am compelled to combat prejudices which are yet too widely prevalent, and which have received their strongest expressions in the writings of one of the most philosophical poets of this century. Many superficial thinkers attach reproach to science because it is different in one age from what it was at some anterior epoch. They confound the changes necessarily accompanying rapid but healthy growth, with those inherent to decrepitude and decay. One of the most perfect departments of science has presented the spectacle of the occasional predominance of erroneous theoretical views, in company with the constant and steady accumulation of those facts whereby its disenthralment from metaphysical speculation was ultimately effected. The study of the heavens only thus more strongly illustrates the invincible character of scientific

method, for its really finished results are ever untouched by the influence of transient speculations. The scaffolding of epicycles and vortices may have sometimes disfigured the appearance of the rising structure of astronomy, but they were quite incapable of affecting its real solidity. The temporary supremacy of erroneous or incomplete theories, and their necessarily ultimate abandonment, cannot depreciate the generally distinguishing character of departments of knowledge, which are founded upon experience. Results derived from observation and reasoning, no matter when obtained, permanently retain a scientific value which no subsequent progress can entirely efface. Vainly, therefore, does a modern poet exclaim:—

“Call Archimedes from his buried tomb,
Upon the grave of vanished Syracuse,
And feelingly the sage will make report
How insecure, how baseless in itself,
Is the philosophy whose sway depends
On mere material instruments :
He, sighing with pensive grief
Amid his calm abstractions, would admit
That not the slender privilege theirs
To save themselves from blank forgetfulness.”

It would scarcely be possible to condense into a briefer space so many elegantly-expressed absurdities. The philosophy here alluded to is physical and mathematical science. Far from depending solely upon material instruments, this philosophy chiefly uses such as are of a purely intellectual character. Most of its material instruments have been devised only by the rarest exertions of mental skill; their successful application ever demands the co-operation of intellectual agencies. The apparatus of the physical inquirer should be as strictly subordinate to his judgment as the implements of an artist are to the guidance of his imagination. Were Archimedes capable of witnessing the events of our day,—were he able to obey the call of the poet, and rise up from his tomb in Syracuse,—he would not find his philosophy forgotten. He would perceive that the manners, the language, the government, the religion of his day, had all vanished; but on entering some of our factories and workshops he would see applications constantly made of his grandest discoveries. On crossing the doorsills of our seminaries of learning, he would hear, publicly taught, demonstrations of some of the propositions he had been the first to evolve; he would see that the records of his labours had become indefinitely multiplied by an art unknown to him, and that the number of his disciples had been increased in a thousandfold proportion. He would find the very exclamation which he uttered

on arriving at that principle which especially consecrates his name, turned into a proverb. He would thus have reason to continually repeat *Ευρηκα*, on observing the results to which his labours had led, and the indefinitely extended group of cultivated minds to which they had become familiar. He would observe that the increased civilization of our day was closely linked with the labours of his successors, and that its most characteristic differences from that of his own age flowed from discoveries of the same class as those which have permanently placed him among the benefactors of our race. In his day he was conscious of the existence of highly cultivated races only among the genial climes surrounding the Mediterranean. Then, civilization seemed impossible amidst the cold and humid forests of the north; now, he would find these regions rivalling, and usually surpassing, the culture of his former haunts. He would find that instead of merely giving to the earth an infinitely small motion with the aid of a lever, as he had boasted he could do, that his successors, partly by the aid of the mechanical principles discovered by himself, had accurately weighed not only the earth but its satellite, the planets, the sun, and stars so distant that he could only slightly approach to them had he started long anterior to his own day, and travelled ever since with a velocity equal to that of the most rapid steam-propelled chariots belonging to the present age of the full development of his philosophy. He would perceive that material instruments, guided by intellectual forces, could compel the powers of nature to minister to the wants of man, under almost any circumstances in which human beings could be placed upon the surface of our planet. He would thus be induced to acquiesce in the enthusiastic foreshadowings of Bacon, whereby science should yet produce an almost indefinite increase in our comforts and enjoyments.

During the period which has elapsed since the appearance of the *Novum Organon*, the contributions made by science to our material welfare fully confirm the promises its author held forth. Everything seems to indicate that the same progression is to advance forward, not with relaxation, but with constantly accelerated vigour. Had science to contend solely with physical difficulties, there seems to be no limit to the amount of material comfort which she seems capable of providing for posterity. She constantly supplies not only new processes for turning the products of nature to our use, but she also accumulates, for the performance of these processes, forces whose energies immensely surpass all that our unaided muscular exertions could achieve. The present annual produce of our coal-

mines has been estimated at about 83,000,000 tons;* of this mass, one-sixth, or nearly 14,000,000 of tons, are supposed to be spent in the production of available mechanical energy. The heat evolved by the combustion of these 14,000,000 tons would, if transformed into equivalent mechanical action, perform the work of more than 80,000,000 of men; and the total quantity of coal raised would be capable of producing force equivalent to the work of 500,000,000 of men. It thus appears that our coal-mines actually supply mechanical energy, at the present moment, to an extent far more than equivalent to the united exertions of the adult population of all Europe; and the total amount of coal raised, if applied solely to the evolution of force, would surpass in its effects the united energies of all the adults existing on the surface of the globe!

These numerical results serve not only to show us the stupendous scale upon which the contrivances brought into being by science are ministering to our wants, but they also answer those sophisms, now happily heard at rare intervals, respecting the injuries inflicted on the working classes by the multiplication of machines. When he is informed that machinery depending on heat performs, in these countries, the labour of 80,000,000 of men, will not the antagonist of machinery rub his hands with joy and exclaim, "Here is the true key to want of employment and periodical tides of pauperism! Cut down these gigantic competitors of the worker, and abundance of occupation will be had for all,—an indefinite scope for all competitors will exist in the labour market, when these equivalents of so many millions of hands are for ever removed." To this I reply, The operation you demand would shut up the labour market almost altogether, for the primary condition of many of the processes upon which these machines are employed, is economy of power. Such processes could never be profitable, and could not therefore be practically carried out without those very sources of power you would cut away. So far from improving the general condition of the working classes, the annihilation of machinery would reduce the greater part of them to idleness and want. The greatest triumphs of engineering science and manufacturing skill would have been impossible without the aid of those easily-controlled and simply-fed Titans, whose iron limbs are incessantly labouring on our behalf. Their inaction would have prevented the growth of many new sources of employment, while necessarily closing up as many avenues of economical access to the comforts

* I am indebted to Mr. W. Firth, of Burley Wood, near Leeds, for this estimate.

and luxuries they produce. Those who strive to overlook the benefits derived from machinery, and the numberless processes which scientific skill has devised for our physical wellbeing, seem to forget that there are some conditions annexed to our terrestrial pilgrimage besides the action and reaction of external nature, and that such conditions may consequently be such as to lie entirely beyond the control of physical science. Our principal material wants are food, lodging, and clothing: our primary mental wants are those connected with mutual communication,—such as we effect by travelling, interchange of thought by writings and books, and all the endless requirements of cultivated natures. Science has had the foremost position in cheapening, improving, and widely diffusing the means of satisfying most of these wants. All kinds of materials for clothing and furniture, innumerable articles of hardware, glass, and china, are now far cheaper, and in general far better, than during former periods. Artificial heat and light for domestic as well as for manufacturing purposes, are now obtained in such quantities, and so much under our control, that the results would in former ages be deemed the operations of magical arts! The communication of thought for purposes of business is now facilitated in a thousand ways. The price of a few books formerly would at present purchase libraries. The increased cheapness and speed which modern locomotion owes to science has augmented the number of travellers in a hundredfold proportion, compared to the period when science may be said to have done nothing in this respect,—when travellers on land used saddle-horses, and when sea voyages were limited by the absence of those guiding principles now furnished by astronomy and physics.

Two elements of great importance in reference to our material welfare have become relatively dearer,—one, at least, of these is actually, as well as relatively, dearer,—these are rent and food. The land of a country, unlike manufactured products, is not susceptible of indefinite extension: emigration can alone deteriorate its value, while every other circumstance attending advancing civilization must tend to exalt it. The increased abundance of the products of industry necessarily tends to augment the relative value of this most stable element of wealth. So far as science influences the construction of buildings, by providing cheaper materials and methods of construction, it necessarily enlarges the means for suitable lodgment. This tendency is largely counteracted by that of land rent, just referred to, over which science has little or no control. Improvements in agriculture, and in means of transferring

products from fertile soils and genial climates to those less favoured, operate upon the whole to improve and cheapen the food of man. Of all the necessities of life, food is that which costs the majority of the population the largest expenditure: whatever would greatly improve its quality, and render it more easily accessible, must tend directly to promote human comfort. Science has largely contributed to these ends; but whatever it may perform in this direction has necessary limits, not only from the inextensible nature of the soil upon which food is raised, but also from a well-known law which political economists have taken great pains to develop during the earlier portion of this century. It seems to be well established, that a sudden increase of food, far more than that of any other of the elements of subsistence, is always followed by an increase in the number of consumers. It is probably owing to the existence of such social laws as this now indicated, and of that connected with rent, that science has not been able even at the present day to augment the sum of human comforts to an extent as far beyond what they actually are, as these are above what existed during the earliest periods when science first made itself felt as a contributor to man's material happiness.

Among the fallacies sometimes put forward, or which silently lurk in men's minds, regarding the position of science as a contributor to our welfare, is the influence ascribed to accident in promoting discoveries. Many discoveries, after they have been made, seem to involve truths so extremely simple, that this fallacy is too frequently admitted as an adequate explanation of their evolution. An appeal to facts, uniformly shews us that no discovery was ever established by accident alone. Accidents may have directed inquiries, and may have thus suggested trains of thought, or systematic observations: such accidents would have occurred in vain, had they not come under the notice of philosophical minds. Thousands of bathers before Archimedes had observed the overflow of water which accompanies a plunge into a full vessel; yet, this ordinary occurrence was fruitless, until the geometer of Syracuse deduced from it the fundamental principles of fluid equilibrium. The swinging of suspended lamps in public and private buildings happened daily for centuries, before it led Galileo to discover the approximate isochronism of the apparatus on which we now mainly rely for accurately measuring time. Many meditative persons had, from the remotest ages, observed the ripened fruit spontaneously dropping in orchards, yet no person was induced to generalise this phenomenon, until Newton determined to inquire whether the same

dropping tendency may not be manifested by bodies in distant portions of space. The ordinary culinary accident of a cover being suddenly lifted from a vessel in a state of ebullition passed unheeded, until important consequences were thence deduced by the imprisoned Marquis of Worcester.

It would be easy to enumerate many more such fruitful accidents, in connexion with which the following general law may be observed, namely,—that the most vital consequences have arisen from accidents so common, so ordinary, of such an everyday character, that their title to be called accidents is doubtful. Extraordinary accidents occur from time to time without producing remarkable discoveries. If, on the other hand, mere everyday occurrences have been fruitful, to what must we refer this circumstance? I admit that it arises from an accident of a very peculiar nature,—from the happy accident that such occurrences were observed by those whose minds were prepared by systematic study of the phenomena connected with such occurrences, and whose powers were well trained to the task of grasping, comparing, and weighing all the different bearings of the surrounding conditions upon the event they may have happened to witness. It is not so much the objective character of the event which determines the discovery, as the subjective character of the mind on which that event may happen to make an impression. Similar events may occur thousands of times without any result: they become fruitful by the accident of meeting with a well-ordered philosophical mind. Were we able to obtain the true history of the infinite multitude of ingenious contrivances which mechanical skill has so largely contributed to the perfection of manufactures, we should learn that wherever accidents had any part in the result, it was always subordinate to conditions similar to those I have indicated. The remarks made on the invention and perfection of the steam-engine, by a philosopher who was personally acquainted with the leading steps of Watts's discovery, will serve to characterize almost all the great products of the human mind which have signally ministered to human wants. The steam-engine, Dr. Black declares to be the masterpiece of human skill; not the production of chance observation, but the result of deep thought and reflection, and really a present by philosophy to the arts. Principal Forbes has truly said, that Watts's early position in Glasgow well typified his labours as a man of science. He was a working mechanic, and a scholar. His was the workshop within the college. Never were the combined labours of hand and head more completely typified, and never have they borne more abundant or richer fruit. The posses-

sion of a limited, but sound knowledge of certain scientific truths may thus become, under some circumstances, of inestimable value to those engaged in the industrial applications of science. Such a possession will enable them to avail themselves of accidents which, by minds imperfectly prepared, might be passed over as unworthy of attention. It is astonishing to reflect on the small amount of real knowledge which suffices to preserve men from wasting time on vain speculations, or attempting impossible inventions. Science has long exercised this kindly guardianship over her votaries; and this protection would have been more effective but for the imperfections in our educational system, whereby, until lately, science occupied but a small space in most of our seminaries of learning, from the primary schools up to the universities.

Amongst the salutary influences exercised by science on modern civilization, there is one which has been recently acquiring additional prominence. An eminent writer has remarked, that modern revolutions, however disastrous in themselves, have brought out a result of capital importance for the advancement of knowledge, in promoting a taste for the study of man and society. The distinguished person by whom this remark was made did not mean that the study of society was only recently a matter of interest: he clearly implies that its strictly scientific investigation had arisen by a wholesome reaction against the errors which have often threatened it with anarchy. Thus it is, that problems of social interest are now attacked, not by rhetorical weapons, but by methods closely analogous to those employed in the study of material phenomena. The conscientious observation and recordation of facts, and the employment of inductive processes of reasoning, are now universally acknowledged to promise the securest grounds for the establishment of a system of social physics.

The ablest political economists have long since aspired to bring a mass of social problems under the dominion of the methods so fruitful in the hands of scientific inquirers; and there seems good reason to think, that all social questions which are connected with our material wellbeing may be successfully treated in conformity with inductive principles. It is true, that a multitude of social questions involve other considerations besides those of our corporeal welfare; yet, as we must believe that truth can never be antagonistic to truth, we need not apprehend any collision on such points between the conclusions of science and those coming to us from a still higher source. On the contrary, when, as far as we can judge, both methods of inquiry are opposed to anarchical principles and

to revolutionary doctrines, we may fairly infer that they are not likely to disagree between themselves. Social science would be comparatively perfect, both in its methods and its results, were it able to express itself with the same clearness and rigour, with the same impartiality as those departments of knowledge which have already profited by the methods it is hastening to employ. One of the most fatal obstacles to the establishment of a true philosophy of social relations has already been more than once combated by the genial influence of modern science. If, as a distinguished astronomer has truly remarked, "political furor is a deadly foe to science," it may be equally affirmed that science constantly interposes its gentle influence to restrain the operations of its foe.

During the great revolutionary war, which for a time obstructed the advance of many a social improvement towards the commencement of this century, England and France were as completely sundered as two hostile nations could possibly be; yet this did not prevent the highest scientific tribunal of the latter country from conferring honour on the most brilliant discoveries of modern chemistry: the discoveries made on British soil by British philosophers received not only immediate recognition from French *savans*, but the highest honours which they could possibly confer. English cultivators of science also displayed that generous impartiality which flows from attachment to natural knowledge, no matter by whom advanced; for, through the intervention of Sir Joseph Banks, at that time President of the Royal Society, arrangements were made whereby all scientific objects destined for French museums, which British cruisers should happen to capture, were safely preserved for transmission to those in whose hands they were to become means for adding to the general stock of information regarding the kingdom of nature.

During the first American war, it is said, that prejudices existed in high quarters against the adoption of Franklin's conductors for the protection of gunpowder magazines, and other buildings especially requiring protection against lightning. It is certain, that national or political prejudices never for an instant influenced the exalted scientific body to which the government of the day applied for advice.

Many more recent illustrations could be presented, still further proving the tendency of scientific discoveries to exalt men above the poisonous influences of local and party prejudices. To some of these I have referred on a former occasion, when comparing the salutary methods of open philosophical discussion with those so frequently adopted in questions of political and social importance.

If I had to perform the task of referring to the absence of philosophical impartiality among a certain class of political writers, it is far more agreeable to allude to instances of comparatively recent date, which appear to show that modern science has commenced to re-act strongly upon the minds of statesmen of a certain order. Every one who has studied the phenomena of heat is familiar with the labours of Melloni. They have been not only universally recognized, but have formed the fruitful groundwork of fresh researches. This eminent inquirer had lived for many years in exile, on account of his imprudence in political matters. Under such circumstances, a *savant*—whose personal influence has been often usefully exerted on behalf of science in almost every part of the civilized world—addressed a letter to Prince Metternich, informing that statesman of the services performed by the Italian philosopher. The Sovereign Princess who ruled the state from which Melloni was exiled, immediately reinstated him, on the representation of Prince Metternich. This act of the Duchess of Parma was almost immediately followed by the appointment of M. Melloni to a high scientific post by the King of the Two Sicilies. It will perhaps be surmised, that the *savant*, to whose influence these results may be principally traced, had some political relations with the exalted persons alluded to. No surmise could be more inexact; for this scientific adviser of the conservative statesman was himself a public man,—holding principles almost diametrically opposed. I need not dwell on the entire extent of such divergency, when you are informed that it was François Arago. This great man, towards the latter part of his own career, was himself, necessarily in circumstances of extreme antagonism to the powers ruling his country. What occurred in his own case was only what Europe had naturally expected. He was exempted from the usual pledges of adhesion to the new dynasty. It is only strict justice to the present ruler of France to say, that he was probably as much prompted by real admiration for the useful and brilliant career of M. Arago, as he was influenced by the force of European opinion.

I happened to be one day at the observatory, about a year before the demise of the illustrious astronomer, when he dictated, in my presence, a note to the Prince President. The latter had communicated his intention to privately visit the observatory, obviously as much to cultivate friendly relations with its director as to examine its scientific arrangements. M. Arago directed his secretary to say, that the Prince would be duly received, and showed everything, with that degree of attention due to his high rank; but the astronomer excused his own absence, on the plea

of the infirmities with which he was beginning to be afflicted.* While, on the one side, the feelings of a member of the provisional government were as strong as ever; on the other, there was doubtless something of that generous admiration for scientific worth which political diversities are unable to eradicate from minds that have accustomed themselves to the contemplation of scientific truths. The wide diffusion of scientific tastes, the immensely enlarged number of persons who in our day turn their attention to the study of natural laws, promises to increase those salutary feelings of justice and impartiality which the habits engendered by sound mental exercise must everywhere tend to produce.

The proudest triumph of science is perhaps its moral influence in elevating the mind to form judgments strictly derived from facts, no matter whether such facts tell for or against our preconceived notions. The methods employed in communicating the truths of science, as well as the methods by which its advancement is achieved, are eminently adapted to impress the necessity of truthfulness, sincerity, and candour, upon all its cultivators. In no department of intellectual exertion is the principle of openness more thoroughly recognized. In many departments of science an author appears, in order to bear his personal testimony as to certain facts that came under his observation, and, like a witness standing in the presence of a court of justice, he tells us not only his name, but frequently that of his profession, and of those learned institutions to which he is attached: we are placed in possession of such information as will enable us to form a tolerably correct judgment as to the value of his evidence. To such a candid system is unquestionably, in a great measure, due the solid nature of our acquisitions in natural knowledge. Every writer fully feels his responsibility for the statements he makes, and he guards himself not only against wilful errors, but he endeavours, to the utmost of human power, to eliminate involuntary mistakes from whatever he communicates to the public. In the sciences of exact observation, such as astronomy and terrestrial physics, it has been found that the personal peculiarities of an observer in regard to vision, hearing, and other perceptive faculties, may influence his results, and methods have been devised for eliminating errors springing from such sources of disturbance. In every department of true science, the efforts of investigators are usually directed to divest the results from any possibility of complication

* It should not be forgotten, that these infirmities were as yet insufficient to prevent the philosopher from receiving the visits of scientific men, or from taking part in the weekly discussions at the Academy of Sciences.

from such causes. In the study of social and political questions, where perhaps more than in any others we are liable to be influenced by circumstances arising from our personal feelings, the methods adopted for the diffusion, as well as for the discovery of natural truths, become well worthy of imitation.

The preceding considerations seem to show, that science exercises powerful moral and mental, as well as material influences, on the growth of civilization. I need do no more than allude to its religious influences, in so far as it tends to open up the most sublime views of the endless power of our Creator. True science ever inspires not only lively admiration, but the warmest gratitude towards the Author of so many wonderfully devised arrangements for the happiness of our race. The railway traveller, who thoroughly understands the labours of Watt and Stephenson, does not regard the memory of these eminent men with less veneration than his illiterate companion, who equally enjoys the advantages of the improved systems of locomotion without being aware of the ingenious experiments and profound meditation from which this system has arisen. In our journey through life, our grateful feelings towards the mightiest of all benefactors will not be diminished by more thoroughly understanding the exquisitely designed arrangements which smoothen our progress through life, and maintain a suitable harmony between our wants and the physical conditions under which we live.

If science contributes to almost all our wants, from those of the most material to those of the most intellectual nature, she also serves to lessen some of the greatest evils connected with our social state. War is an evil unhappily incident to mankind, at every stage of their advancement; but history seems to prove, that the more this calamity depends for its sustentation upon mere physical force and individual prowess, the more likely is it to be barbarous and prolonged. Science, by rendering warfare more certain, more decisive, and more brief, has unquestionably done much for human felicity. Long before Bacon announced the proud claim of knowledge, by which he identified it with power, this claim was poetically symbolized in connection with warfare. Who can read in Homer, the combat of Mars with Diomed, without feeling this impression? Diomed conquers the god of battle, not by human force or human valour; for Homer did not intend to exhibit the strange incongruity of a mere mortal surpassing the god of war at his own business. The conquest is really achieved by Minerva; and she is not only the patroness of science, but also of arms. Although her statues and busts, by their charming union of intellectual expression with feminine loveliness, form a frequent symbolical decoration of estab-

ishments intended for the cultivation of knowledge, her lovely features are always o'ershadowed by a warlike helmet. This double character of the subjugator of Mars may symbolize the superiority of science, even in warfare, over brute force, although associated with valour. Many a modern siege could be quoted in which the prowess of Minerva was still more distinctly manifested than in those memorable and mythical passages of arms which formed the subject of the Iliad. The resources which science now places at the disposal of civilized nations engaged in war, not only allow them to strike more energetic blows, and thus to more rapidly terminate the conflict, but also enable hostile powers to more accurately estimate each other's strength, and thus to more equitably weigh all the considerations that may induce them to maintain or to return to a state of peace. If, at the present crisis of events, those formidable armaments recently furnished by science should fortunately not be required, they shall have far more effectually performed their work by assisting to avert war, than if they were actually employed with the most overwhelming results.*

To those who have profoundly studied the history of science, and who have also made themselves familiar with the general progress of human events, I ought to offer some apology for many of the foregoing remarks. The points which I have endeavoured to establish, they would perhaps readily admit. They would scarcely doubt, that the advancement of science and the progress of civilization are co-relative,—necessarily and inseparably intertwined. They would probably acknowledge that no other merely intellectual agency, compared to science, has performed a greater aggregate amount of work for the elevation of our race; yet, until very recently, the position accorded to cultivators of science was such as might lead strangers to the conclusion, that science was considered to occupy an insignificant place among the sources of our national greatness. On this point we have unquestionable testimony.

Several years ago an illustrious scientific body in this country was presided over by one of the uncles of our Sovereign. While extensive studies and constant intercourse with men of science enabled the Duke of Sussex to perfectly appreciate what was due to science itself, his personal position rendered him eminently impartial when comparing the circumstances under which science stood in relation to the state and to the nation, in comparison with the conditions attached to other intellectual occupations. Were I less wholly

* On the morning immediately after these words had been uttered, decisive intelligence arrived from America as to the amicable settlement of the affair which had led to apprehensions of a rupture between England and the United States.

devoted to scientific studies, I would perhaps quote the words of this enlightened Prince. Those who will peruse his remarks, will readily excuse me for taking pains to maintain what may appear to many to require no proof: the influence of scientific culture on national and cosmopolitan welfare. The words of the Duke of Sussex were pronounced about thirty years ago, from the chair of the most venerable of the learned societies of England. Since that period, statesmen have taken a few steps in the direction of more completely recognizing the national importance of science. To constantly enforce such views, is one of the tasks especially set forth for itself by the distinguished body which three years ago held its annual meeting within this great centre of industry. Long before the Leeds Meeting of the British Association, another exalted personage was generally recognized to possess not only scientific and literary tastes of the same refined character as those of the former President of the Royal Society, but he was also known to be animated by similar ardour for assisting in the removal of any impediments obstructing the advancement of knowledge. Within this very town it was resolved to invite the younger Prince to occupy a corresponding position in the new Scientific Association which his venerable relation had held in the older Society. Never was a choice more completely justified by its results. Never were the claims of science upon the state, and the nation, more ably maintained, than they were from lips which have so recently been closed in the long silence of the grave.

The sentiments uttered by a Prince, whose early loss has plunged an entire nation into the profoundest mourning, could not be otherwise than generous. They were also appropriate. He indicated the necessity of removing any existing impediments to science, resulting from causes of a political nature, from the restrictions of peculiar laws, and from the relations subsisting between different countries. He urged especially the claims of those departments of science whose remote bearing on results of immediate practical utility would cause their importance to be overlooked. "This," he said, "is more particularly the case in an active, enterprising, and self-determining people like ours, where every interest works for itself, considers itself the all-important one, and makes its way in the world by its own efforts. Is it to be wondered at, that the interests of science, abstract as science appears, and not immediately showing a return of pounds, shillings, and pence, should be postponed, at least to others that promise immediate tangible results? Is it to be wondered at, that even our public men require an effort to wean themselves from other subjects, in order to give attention to science and men of science, when it is remembered that science, with the

exception of mathematics, was, until of late, almost systematically excluded from our schools and university education,—that the traditions of early life are those which make and leave the strongest impression on the human mind,—and the subjects with which we become acquainted, and to which our energies are devoted in youth, are those for which we retain the liveliest interest in after years,—and that, for these reasons, the effort required must be both a mental and moral one?"

These remarks serve not only to excuse the influential persons on whose support science should securely rely, for the manner in which they have sometimes overlooked its active agency in promoting human welfare; they also furnish conclusive arguments as to the necessity of the attempts of those who feel called upon to direct attention to those attributes of science by which it is entitled to hold the most prominent place among the causes of advancing civilization.

Eleven years have elapsed since a museum of the products of the industrial skill of the human race arose in the capital of this country.* Although its existence was temporary, its influence appears destined to be permanent. The grandeur of its results has stimulated the nation to bring about its reproduction. This has taken place after an interval comparatively brief as a portion of an historical epoch, yet amply sufficient to enable mankind to form a correct judgment as to the constantly accelerating force which science develops on their behalf. The new Museum of the material results of civilization shall plead with silent eloquence in favour of those views which its originator advanced when he stood forward, not as an advocate of superficiality in mental cultivation, nor as a seeker after popular applause—which can be so easily won by ministering to ephemeral tendencies,—but when he upheld principles deeply affecting the future destiny of our race, with an earnestness that characterizes minds of an order whose departure from amongst us first fully unfolds the greatness of their qualities.

* It is impossible to refer to Industrial Exhibitions, without noticing the admirable collection of the products of local industry which was brought together at Leeds, in 1858, partly for the information of the Prince—whose loss the nation now so deeply deplores,—and partly to enable the assembled philosophers of the empire to comprehensively estimate the varied developments of practical science, in a town which they had chosen for one of their most successful and agreeable meetings. The Exhibition of Local Industry was indeed typical of many other excellent arrangements which have given the meeting of the British Association at Leeds an enduring place in the memories of those who were so fortunate as to be present.



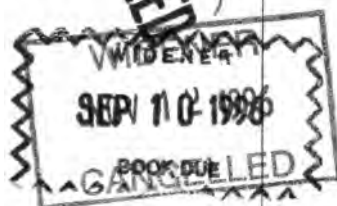
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